THE MARINE REVIEW

VOL. 49 CLEVELAND DECEMBER, 1919 NEW YORK No. 12

Shipping Bills Flood Congress

Measures for Promoting Merchant Marine Engulf Legislators—Analysis of Principal Proposals — Private Ownership Leanings Need Support

HOPE for affirmative action by congress in laying down a definite policy for operating the great merchant marine which the war brought to this country now centers on the action of the regular session which convenes early in December. Work of the special session, particularly as far as the senate is concerned, has been so completely focused on the peace treaty that this great domestic issue has been shelved. The house of representatives, free from any treaty making powers, has shown an inclination to make progress on marine legislation, always with the knowledge that the senate would take no action.

Analysis of the many bills brought before both branches of congress gives only an imperfect insight into the probable trend of the policy as finally adopted. The one thread woven into the fabric of all bills assured of serious consideration, is that of private ownership. The means by which this sound economic position is to be attained differ so widely that the passage of certain of these bills would defeat the very object their advocates profess to desire.

House Bills Are More Specific

Measures considered by the house committee lean more strongly toward private ownership and their provisions call more directly for the removal of the government from vessel ownership and construction as rapidly as possible. In the senate, various bills seek to secure the same end but the provisions assure federal intervention for a much longer period.

The senate bill as drawn by the chairman of the committee charged with formulating a merchant marine policy, is defended by its supporters on the same solid foundation of private ownership. The method chosen to bring about this condition is through a new government corporation with a guaranteed life of 30 years and unlimited powers. This corporation is to supersede both the shipping board and the Emergency Fleet corporation, taking over all ships, yards, contracts and liabilities. The shipping board would fill the advisory role for which it was originally cast. Suitable provisions relative to coastwise trade, through rates and postal service are included.

With the experience of the war so vividly remembered, this new federal corporation can be visualized as it expands mushroomlike. The sound of its cymbal announcing its position as "operator of the largest fleet in the world's history" seems already to be stirring our auditory admiration. The corporation is specifically enjoined to keep always before it the goal of private ownership. Washington, however, has found the job of demobilizing several million fighting men to be almost a vacation compared with the task of removing from government service innumerable holders of civil positions who filled Washington for months after the armistice. The ability of this proposed corporation to keep steadily in mind for 30 years, subject during that period to the whims of 15 different congresses, the ideal of sawing the props from under its own position is questionable.

Concedes Only a Ten-Year Life

An English shipping authority has communicated to his associates in England an analysis of conditions as he found them in this country. He expresses the conviction that American strength in world maritime affairs will be a memory within 10 years. Opposition to this view can be found readily among equally competent British experts and his views are thoroughly refuted by most authorities in this country. American possession of a merchant marine is such a tremendous transition from the hopeless conditions before the war, that some still find it illusory. With interest in marine subjects felt more nationally than before the war, this clearly is the time for energetic action in promoting congressional wisdom. The policy finally chosen by the incoming congress will make our present great merchant fleet either a temporary or permanent asset. Certain minor laws already enacted carry the right spirit and the views on private ownership held by the legislators furnish the stable foundation on which permanence can be built.

Digitized by Google

World Charter Market Reviewed by

OUTLOOK GOOD

American Merchant Marine Continues to Grow in Spite of Delay in Formulating National Policy

WHILE congress debates and workers strike, the American merchant marine continues to grow. The hardihood of steamship lines is in peculiar contrast to the dilatory tactics of the government in failing to determine upon a national shipping policy. Approximately 2,000,000 tons of new ships are being fitted out and over 3,000,000 tons are on the launching ways in American yards. Disgruntled labor union heads have met with little success in calling a strike among shipyard workers. The tonnage available for ocean cargoes has grown with leaps and bounds and yet there does not appear to be any diminution in demand for space. In 1914 less than 9 per cent of our cargoes were carried in American vessels; in 1917 this amounted to only 14.6 per cent, while today it reaches more than 66 per cent.

According to statistics now available, the proportion of native born and naturalized Americans among the officers and crews of American merchant ships during the past year increased to 74.6 per cent of the total and is now substantially the same as in 1914 before the big increase in the merchant fleet started. Whereas in 1914 two-thirds of the American crews were native born and one-third naturalized, today four-fifths are native born. No better proof is required of the awakening interest of America in the merchant marine. In the port of New York, the stupendous growth of American interests is noticeable. The city has voted $5,300,000 for the construction of 14 new piers. Pier space is demanding abnormal rentals and American lines are not behind hand in paying such rentals. A pier which was once leased by the Hamburg-American line for $75,000 per annum, is now being offered to an American line for $328,500.

Strikes Cause Delay

Logically, shipping conditions on the Atlantic should be crippled. A handful of radical longshoremen were successful in starting a strike at the port of New York and, as usual, intimidation prevented those who were not in sympathy with the strike from going back to work. Difficulties resulted. In some instances, passengers arriving on the large liners assisted in removing their own baggage, and the crews loaded other ships in order to depart. Federal troops were held in readiness to protect the willing workers but the soldiers were not called in. The fair-sized tie-up of New York shipping continued throughout October, after which the individual unions began voting to return to work. The operators had no sooner felt confident that they had the strike of the longshoremen broken than the walkout of the coal miners came. A cessation of coal production, it is felt, would do more damage to ocean shipping than most any other industrial trouble. Although most of the transoceanic and coastal lines have been moving some freight, conditions have not been such as to produce satisfaction on the part of shippers.

Supplies of coal all along the north Atlantic coast have been running low, and dealers began to advance prices the first of November. Bangor, Me., dealers were quoting $15 per ton. Whereas these concerns usually carry from 30,000 to 40,000 tons, the first of November found them with but a few days' supply, with an uncertain outlook ahead. A number of fixtures have been reported in the market during the past month despite these unsettled conditions. Charters appear to be going up, with quotations advancing from $10.15 to $10.45, whereas $10.50 now appears to be the prevailing. Some sailers were noted among the charters, although many steamers were involved. The business of ship operating promises to increase in stability. An association of American operators was organized in New York during the past month and a program to promote their interests was mapped out. The association will make an exhaustive study of all conditions entering into the operation of vessels.

Vessel Sales Reported

The International Mercantile Marine has purchased two 11,800 deadweight ton cargo carriers from the shipping board. This company has established a freight service from Norfolk, Va., to Liverpool and London. The Virginia Shipbuilding Corp., a subsidiary of the United States Steamship Co., has purchased thirteen 9400-ton vessels from the board. Among the other sales made by the board during the past month were four ships to the French-American line, and one each to the West Indies Steamship Co., Inc., Moore & McCormack, American Star line, R. W. Morrison, the Clinchfield Navigation Co., the Fidelity Steamship Co., Edward P. Farley & Co., and Boland & Cornelius. Purchases from the shipping board appear to be but a minor activity of the steamship companies. The Shawmut has let contracts to the Chester Shipbuilding Corp. for two 10,500-ton cargo carriers, and the A. G. W. I. has let contracts with a number of Atlantic yards for eight

To Import Coal

EIGHTEEN steamships, with an approximate aggregate tonnage of 70,000, have been ordered by the Danish government to be placed in the American coal trade, according to recent reports current in Washington. Coal shortage in Denmark is said to be the cause of the decision. Importation of coal from America to the Danish kingdom is a new departure and it is expected to assume large proportions. Before the war, Denmark imported and consumed approximately 4,000,000 tons of coal and coke annually, the greater part being supplied by Great Britain. Last year Denmark imported 2,000,000 tons of coal, most of which came from German mines.

Digitized by Google

8800-ton tankers. New construction and repairs to the older ships of established lines indicate that the maritime interests are preparing for competitive conditions and are attempting to have economic vessels for operation. The International Mercantile Marine is planning to change five liners into oil burners. Two of these, the KROONLAND and the FINLAND, are in the American line fleet, and three, the MANCHURIA, MONGOLIA and MINNESOTA, are in the Atlantic Transport line. The Panama Railroad Steamship Co. is having the ANCON and the CRISTOBAL converted.

There has been an abnormal rush of passengers for bookings to resorts in the West Indies with the consequence that all available accommodations are sold up for approximately a month in advance. This rush to the West Indies is said to be due to the diversion of traffic from the American winter resorts by prohibition. The Munson line has announced a twice-a-week freight service from Mobile to Havana, a weekly service from Mobile to Matanzas and Cienfuegos. The Ward line has resumed the freight services to Cuba, Brazil and River Plate and to Lisbon and Bilboa. The Mallory line reconditioning the combined passenger carrier, HENRY R. MALLORY, and will place her in the Genoa-Marseilles service.

Establish Many New Lines

The Tropical Steamship Corp. will establish a steamship service between New York and the ports of Kingston, Jamaica, Cartegena and Puerto Colombia. Among the noted new shipping companies of last month was the Green Star line which will absorb the fleet of five steamers heretofore operated by the Nafra line. The former Nafra steamers will be continued in the Italian service, but the new company intends to purchase other vessels and engage upon other routes. It is proposed to engage in the passenger business as soon as suitable steamers can be procured. Joseph Slechta heads a new line known as the American Lloyd Transport Co. This new company is closely affiliated with the United States Food Products Corp. and will engage extensively in the West Indian trade. It is also expected to participate in the Mediterranean trade. The ships of the British Molasses Co. are reported to be involved in the new shipping organization. Electing General George E. Goethals as president and Kermit Roosevelt as secretary, the new American Ship & Commerce Corp. is said to be planning some extensions to its subsidiary, the Kerr line. A Philadelphia agency has been opened and it is said that a regular passenger service to Greece and the Near East is proposed. The Acme line has announced the inauguration of a new freight line to Havre and Antwerp.

The States Marine Co., Baltimore, will maintain a regular service from Baltimore to Copenhagen and Gothenburg. The Baltimore-Oceanic Steamship Co. will inaugurate a line to Mediterranean ports. The Oriole Steamship line has initiated a service from Baltimore to Rotterdam. The Dixie Steamship line expects to maintain a service from Galveston to Copenhagen and other Baltic ports. The Standard Steamship Co. will offer a service from Baltimore to Salonica, Patras and Piraeus. Many of these new lines are to be maintained temporarily with the use of shipping board vessels. While a great proportion of the government vessels are allocated as tramps, the operating companies are gradually getting them into lines of a semblance of permanency. The shipping board has decided to maintain for a year longer at least the Manila-Continental Europe-United Kingdom freight service. The Barber line will be manager and operator.

Polish and American interests have organized the Polish-American Navigation Co. and purchased a steamer from the shipping board, renamed her the KOSCIUSKO and inaugurated a service between New York and Danzig. A second boat has been purchased by this line in England. Another Polish line which attempted organization in Philadelphia under the name of Polska Korporacya Okretowa, came to an abrupt termination in its incipiency. New York negroes met at Madison Square garden recently and solicited subscriptions to the Black Star Line Steamship Corp., a line which it is proposed will be owned and operated entirely by negroes.

More U. S. Ships on Pacific

Taking the charter situation in north Pacific circles as a whole, it may well be characterized as nominal. In some directions the demand for vessels is strong, while in other routes no business is offering. The market is strongest in the direction of the Orient. There is an unusual demand for lumber space to north China, where heavy buying has been in progress. Lumber is also moving in generous shipments to Japan where the market has recently revived. Some inquiry is being made for sailing ships to carry lumber to South Africa

Plans New Line

WITH the object of giving service, especially to the shipbuilding industries, a new line will be opened between Philadelphia and San Francisco via the Panama canal, according to H. C. Ewing, Pacific coast manager for D. C Andrews & Co., New York representative of the new line at San Francisco. It is said that the new firm has the financial backing of the steel interests at Philadelphia and that the project is made possible by the present high rail freight rates on steel to the Pacific coast. The present rate is $1.37½ per hundredweight and it is said that the water rate will be nearly 50 per cent less. With cheaper rates on steel, Pacific coast yards can meet competition.

PACIFIC QUIET

Situation in North Pacific is Normal While Business is Sporadic—Oriental Market Continues Strong

Digitized by Google

and a few charters in this direction have been negotiated. Due to the strike of longshoremen at New York, some general Oriental cargo has been diverted through the Puget sound gateway that was originally intended for the all-water route out of the Atlantic metropolis. Cotton and steel are coming to the north Pacific for trans-shipment to Japan and China, but neither of these staple exports are showing the great volume of a year ago. But the number of steamers plying between the Pacific coast and the Orient is considerably less than a year ago. This is principally true of Japanese tonnage which has been diverted to more profitable sea lanes elsewhere. American tonnage has greatly increased on the Pacific since 12 months ago and regular sailings under the American flag are being furnished out of north Pacific ports to China, Japan and the Philippines. Speaking as a whole, there is just about sufficient tonnage to care for the present movement of Oriental freight.

Criticizes Ship Board Policy

Some of the regular lines to Japan and China have their steamers booked full for the next four months but this is not true of all the lines. While shipping board vessels are getting their share of the business, there is, among brokers, some criticism of the shipping board because the government will not pay commissions as do most of the private operators. Brokers claim that government vessels cannot expect to compete successfully unless the same methods are employed as by private owners. This feature is cited as one of the matters in which the government has shown a vacillating policy which leaves shippers and operators in the dark.

One contract for moving 30,000 tons of steel through Seattle to Japan is reported, while considerable cotton has also been booked, although much of this export, in former years seeking tonnage through this gateway, is now moving by the all-water route out of gulf ports. Due to the steel strike and the shortage of cars, ship operators have found it necessary to fill contracted space with local cargo and consequently much lumber has been taken to the Orient in space originally taken for cargo coming across country by rail. Lumber is still commanding a $35 rate to Japan and China and much of it is offering.

Lumber Rates Unchanged

Exporters are offering to pay $55 for lumber to a French port but the business has not been taken. No fixtures are being made for lumber to the United Kingdom because of the low rate of exchange and the fact that nearly all this business is being handled by the British government, which placed its orders in British Columbia and is moving cargo in new bottoms, built for the French government in British Columbia yards.

The Transports Maritime a Vapeur has inaugurated a regular monthly service between the north Pacific and Marseilles with the sailing of the French steamer MONT CENIS. This vessel took part cargo of salmon at Seattle and other cargo at Vancouver, B. C., Portland, Oreg., and San Francisco. The next vessel of the line will be the British steamship SOUTHPORT. Additional vessels will be furnished for a sailing every month.

The shipping board has placed its first steamship on berth for Hamburg direct and cargo is to be furnished at Puget sound ports, Portland, Oreg., and San Francisco. This vessel is the EFFINGHAM, just completed and if there is sufficient business, regular sailings will be given. The government is maintaining its regular monthly service to Great Britain and increasing quantities of lumber and salmon are moving.

Lumber freights from north Pacific ports remained unchanged since a month ago. The market is fairly strong, especially to California, to which rates are still $8.50 to $10. Hawaiian islands freight is $17; New Zealand and Sydney, $37.50; Melbourne and / or Adelaide, $45; West Coast, $35 to $37.50, and Cuba from $21 to $23. There is some call for tonnage to Cuba and a few fixtures in this direction have recently been announced. The West Coast is quiet but the Australian demand is fairly good.

Boston Equipped for Trade

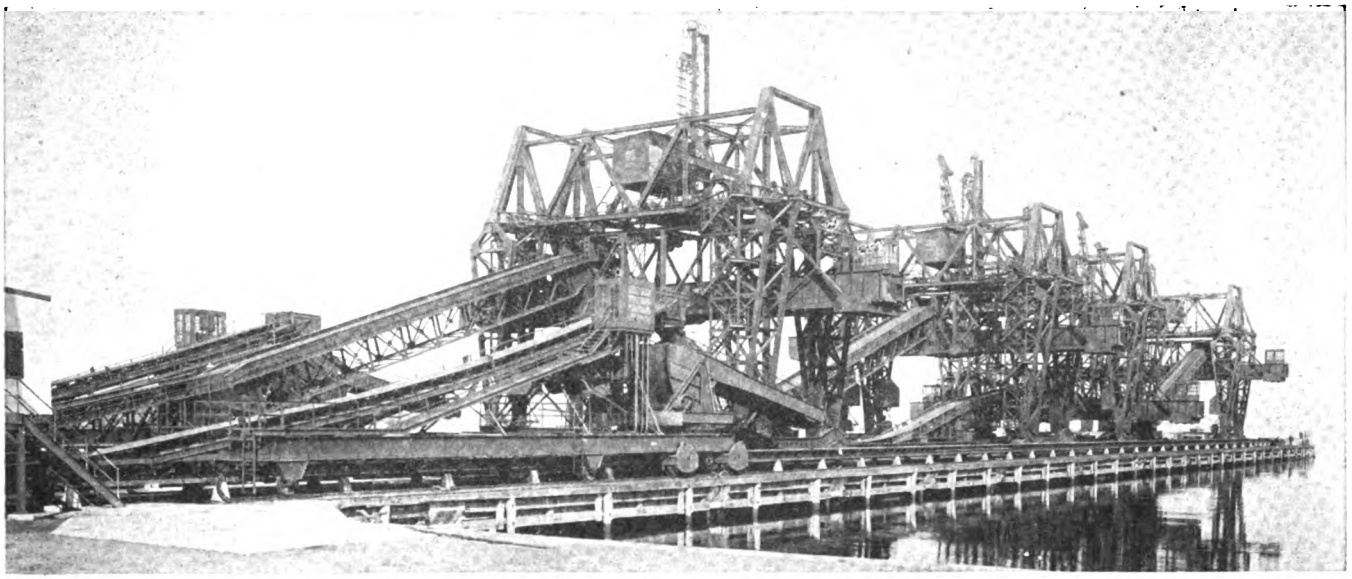
A new note of interest has developed in the Boston port situation. The war has left the port equipped for almost any degree of shipping activity. All that is needed is freight. Toward this end, the foreign freight forwarders of Boston have formed a permanent association which action is recognized as an important move in the shipping situation. The export freight through New England ports has held up remarkably well considering the longshoremen's strike and the partial embargo on shipments to England. Imports while showing a balance in their favor against exports have dropped off in comparison with the previous month's total.

The dock strike at Boston was of short duration and on account of the extensive labor troubles at New York, much foreign freight was diverted to the northern docks. Considerably more would have been diverted had not the Boston longshoremen, out of sympathy for the New York freight handlers, refused to handle goods originally consigned to that port. Records show that 17 new concerns were organized to engage in shipbuilding and ship operation in New England during the month and increased activity in construction is reported at many ports.

Chartering Light in New England

Chartering has been light due largely to scarcity of available vessels. Coastwise orders have been exceptionally low. New direct services continue to figure in Boston commerce. The Canadian Steamship Co. will inaugurate a freight and passenger service between Boston and Liverpool. The Cunard line has started a new service between Boston and Piraeus, Greece, and a several million dollar cargo of Egyptian cotton has arrived as the first shipment. The Anchor line will add two 10,500-ton steamships on the Boston-Glasgow service. Two new Cunard liners will also be added to the Boston-Liverpool service. A new line between Boston and Australia will soon start operating. The shipping board has made further assignments of steamers to Boston concerns. The COUNCL BLUFFS has been assigned to the Warren Transportation Co., the SHICKSHINNY to C. H. Sprague & Son, and assignments have been made to the United Fruit Co. and other concerns. The export machinery market has shown a decided increase and a steady demand exists from foreign buyers for many New England products in this line.

Digitized by Google



Conveyor belts and four coal loading towers at Curtis bay coal pier, Baltimore harbor

New Design for Coal Loading Pier

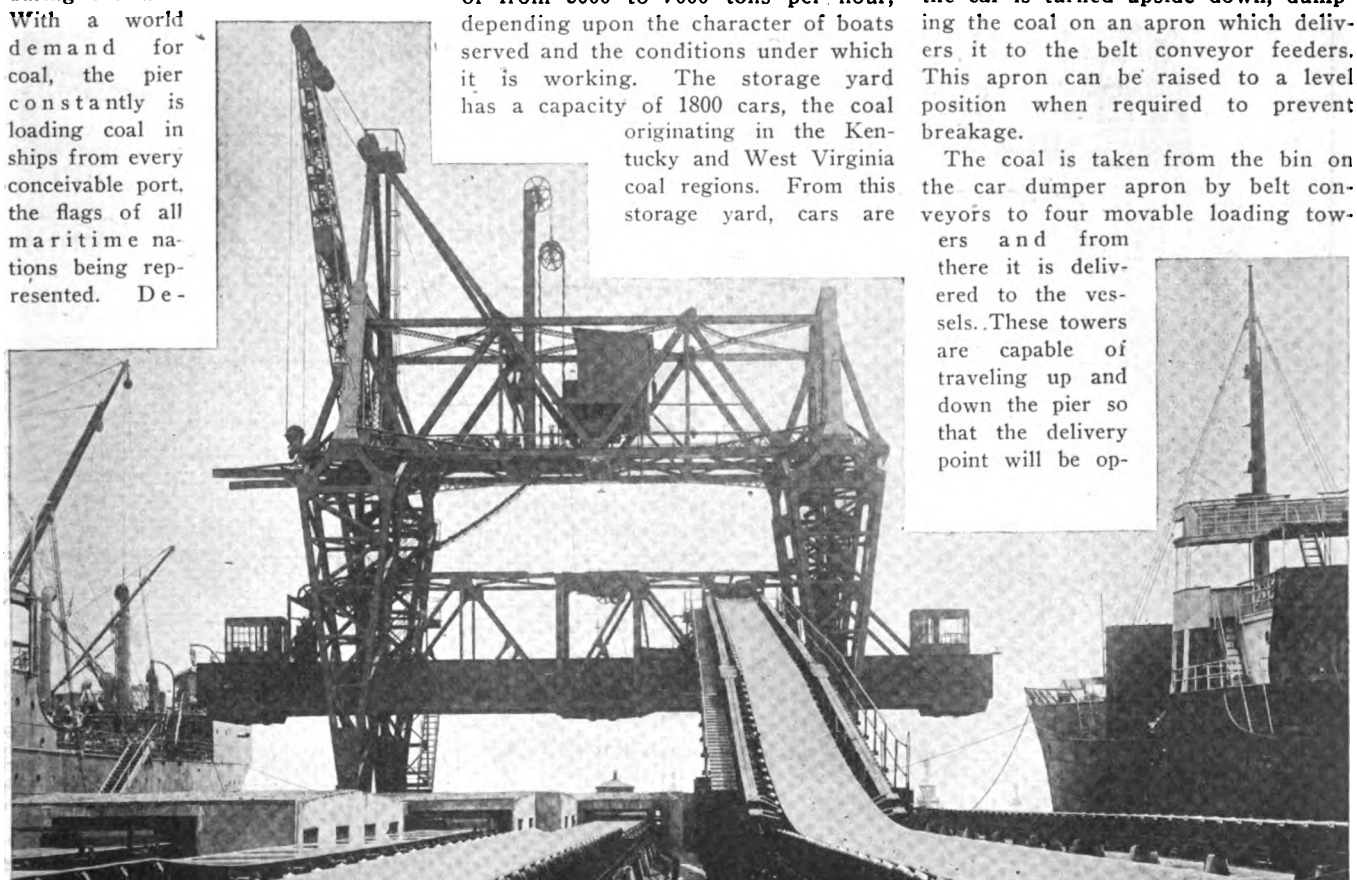
BY W. L. MOFFETT

THE largest in the world, and modern in every respect, the coal pier of the Baltimore & Ohio Railroad Co., at Curtis bay, Md., in Baltimore harbor, is proving of inestimable value in peace times just as it proved of similar value during the war.

With a world demand for coal, the pier constantly is loading coal in ships from every conceivable port, the flags of all maritime nations being represented. Despite the enormous calls for coal and the great number of ships which come to the pier for supplies, this modern loading plant has a capacity fully adequate to meet the demands made upon it.

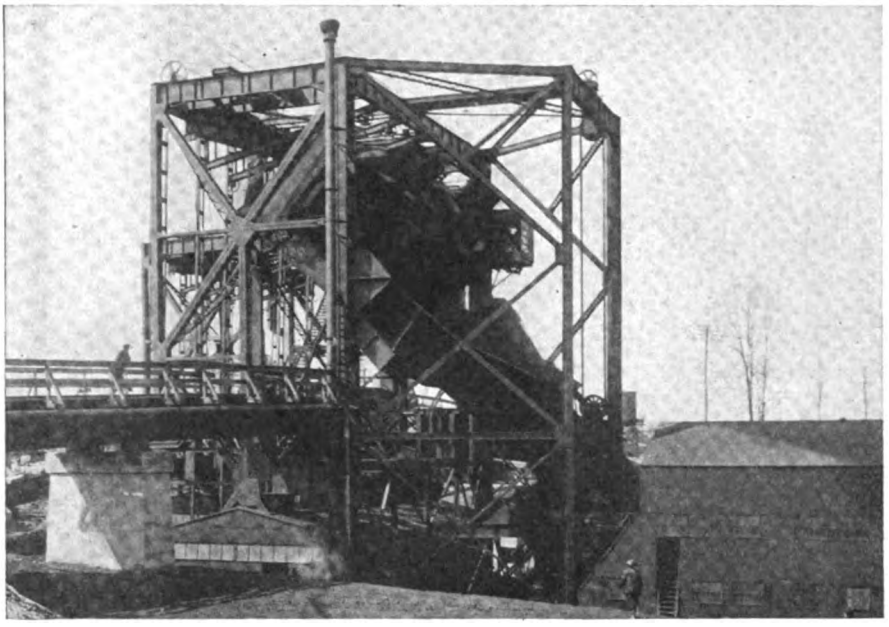
This pier has a loading capacity of from 5000 to 7000 tons per hour, depending upon the character of boats served and the conditions under which it is working. The storage yard has a capacity of 1800 cars, the coal originating in the Kentucky and West Virginia coal regions. From this storage yard, cars are pushed over the hump and drift on a 1 per cent grade to the barney pits. The term "barney" is applied to the haulage cars which carry these loaded cars up a 11 per cent grade to the car dumpers. After the car is placed on the car dumper cradle, it is clamped and the car is turned upside down, dumping the coal on an apron which delivers it to the belt conveyor feeders. This apron can be raised to a level position when required to prevent breakage.

The coal is taken from the bin on the car dumper apron by belt conveyors to four movable loading towers and from there it is delivered to the vessels. These towers are capable of traveling up and down the pier so that the delivery point will be op-



WIDE RUBBER-FACED BELTS CARRY THE COAL TO CROSS BELTS WHICH DEPOSIT THEIR LOAD IN THE VESSEL'S HATCHES

Digitized by Google

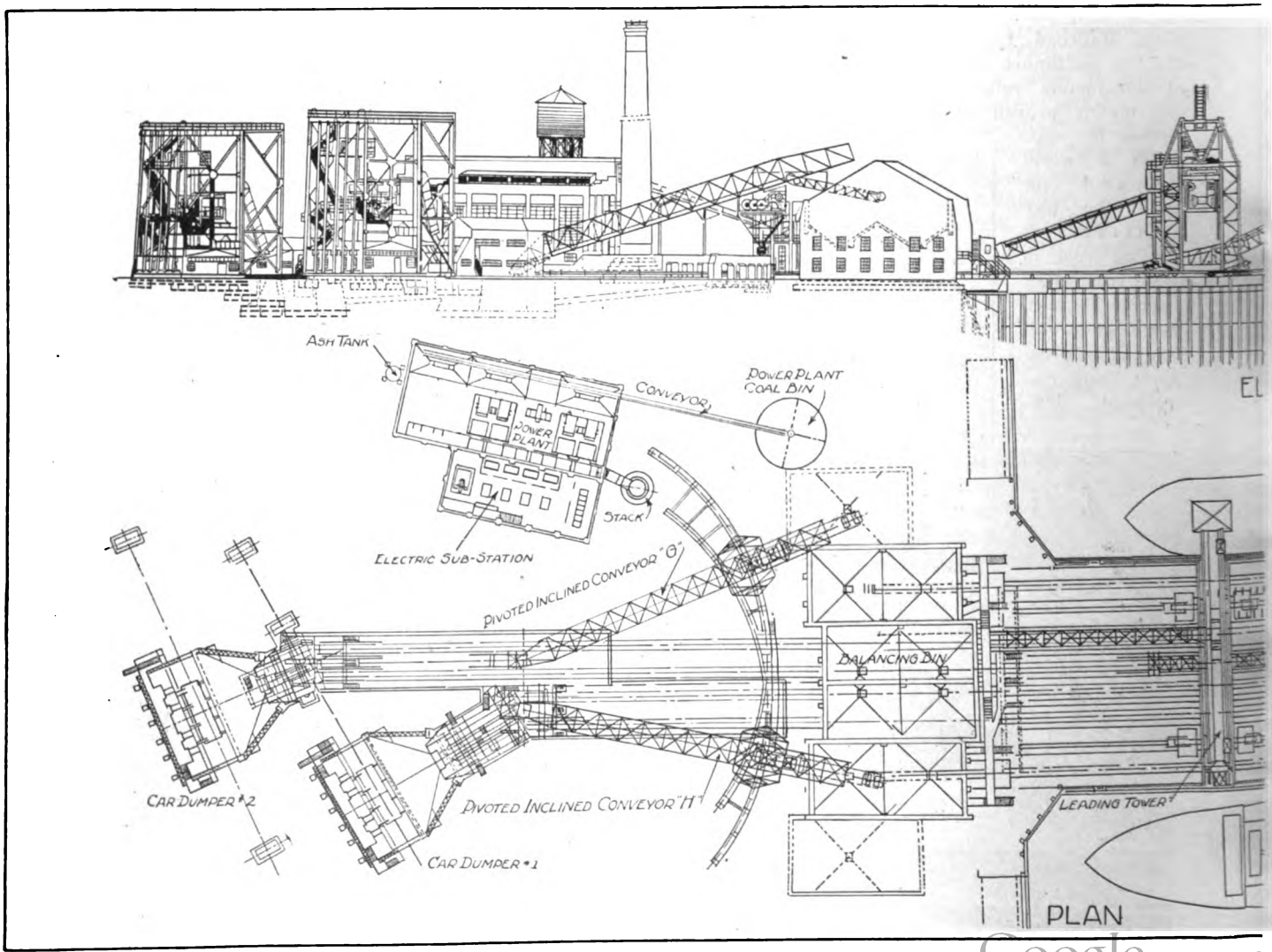


DUMPING THE COAL CAR—THE COAL FALLS ON A STEEL RECEIVING APRON

posite any hatchway it is desired to fill. A cross belt is provided on each tower which can be run out on either side of the pier for a distance of 35 feet so that the coal can be distributed uniformly through the hatch. The pier is 160 feet wide and 700 feet long and is built on concrete piling with a concrete deck. The belts are made of canvas faced with rubber on both sides. The largest belt is 60 inches wide and has 1000-foot centers. The belts carry 100 pounds of coal per lineal foot and travel at a speed of 500 feet per minute, making a carrying capacity of 1500 tons per hour, per belt.

The car dumpers can dump 50-ton cars at the rate of 60 per hour. They also have a capacity of forty 100-ton cars per hour. From this it will be seen that they have a maximum working capacity of 6000 tons per hour with 50-ton cars or 8000 tons per hour with 100-ton cars.

Coal can be delivered from each dumper to the balancing bin, two loading towers and trimming machines simultaneously or to one or any number of the four units independently. All of these units are under the absolute control of the operator, starting and stopping equipment being placed in the operators' cabs on the traveling or loading towers. It is possible for one, two or more vessels to be loaded at the same time



PLAN AND SIDE ELEVATION OF MODERN COAL PIER BUILT BY THE BALTIMORE & OHIO RAILROAD CO. AT CURTIS BAY, BALTIMORE

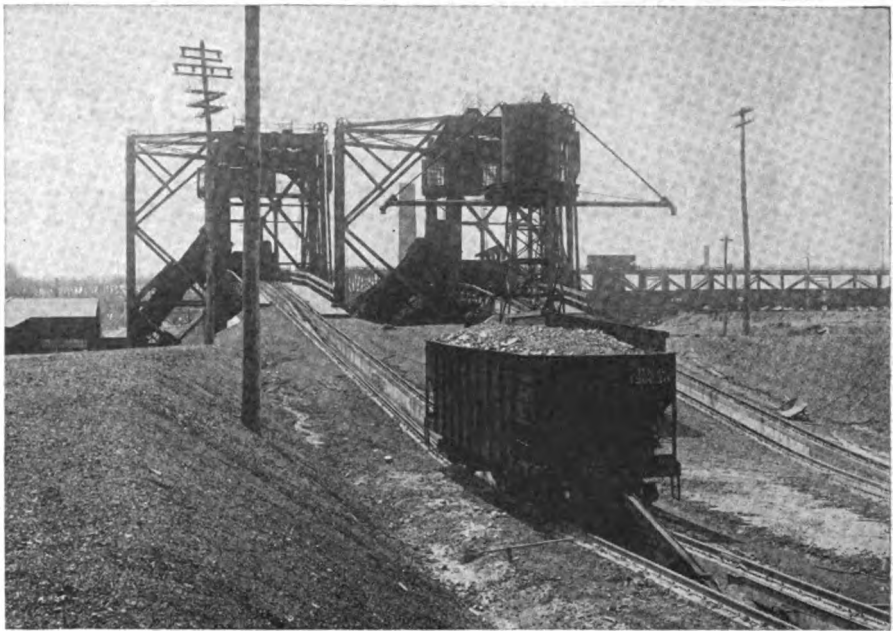
Digitized by Google

from either side of the dock, or it is possible to put the full capacity of the pier into one ship, provided the vessel is able to receive the coal at this rate.

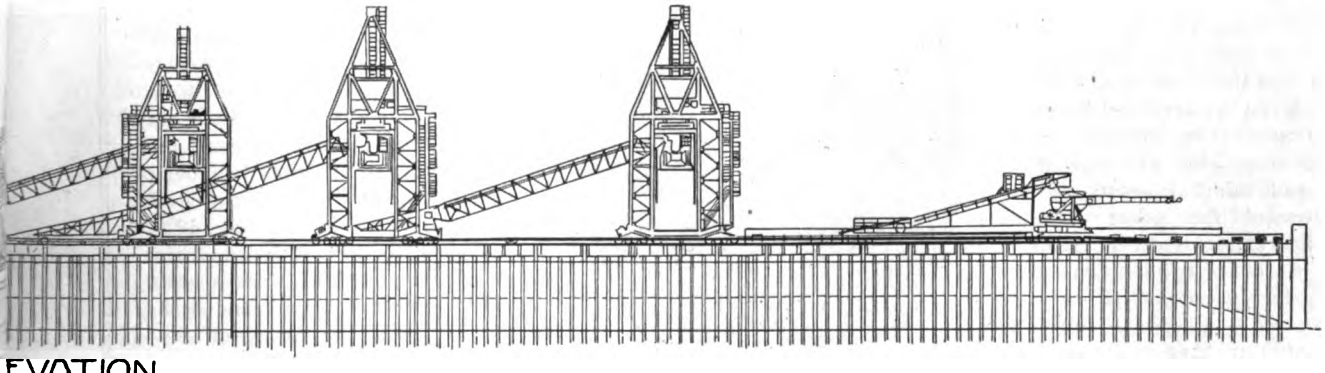
The character of vessels now used on the Atlantic seaboard is such that they cannot possibly handle the amount of coal the pier is capable of loading. It is hoped, however, that in constructing new vessels they will be built to receive the coal faster than is possible with the present working capacity.

In order to handle as much coal in the winter as in the summer, a thawing shed has been provided into which 22 cars are placed at one time. The temperature inside of the house is approximately 150 degrees and usually in from 20 to 30 minutes the cars are sufficiently warmed to loosen the coal from the sides.

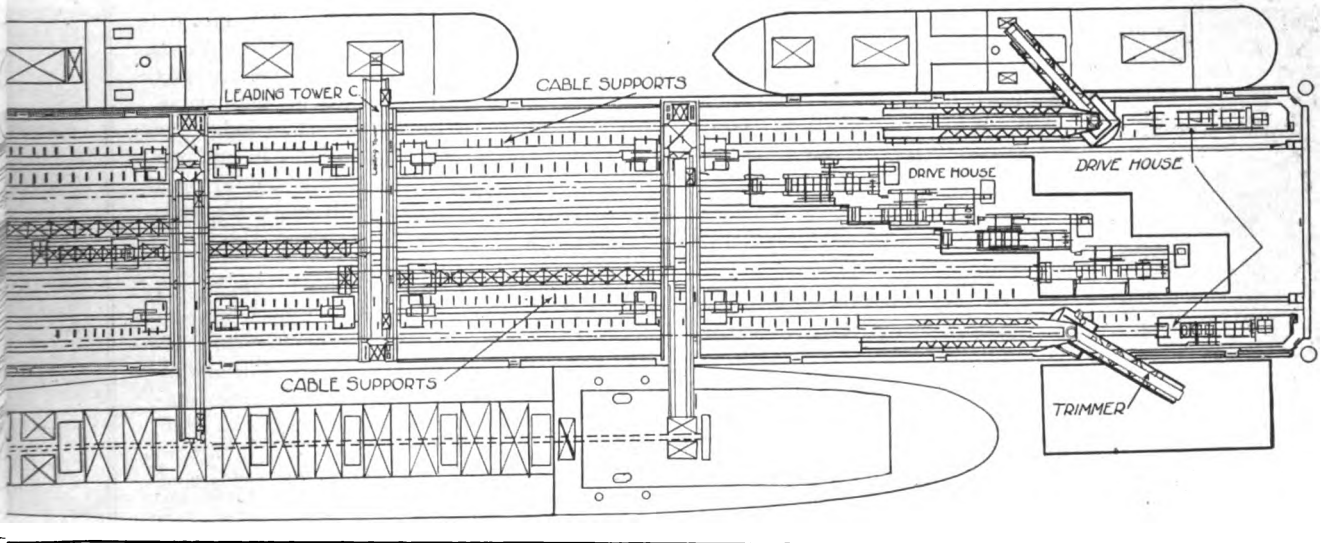
The plant is designed to provide a minimum amount of breakage. It cost approximately $2,500,000 and was completed in December, 1916, one year after work was started. The site of the pier, located on the Patapsco river, was shallow water when the work was started so that it was necessary to dredge out 500,000 yards to provide water 35 feet deep on both sides of the pier. This material was dumped on the low ground which is now the ready yard for hauling cars to serve the pier.



LOADED COAL CAR BEING PUSHED TO THE CAR DUMPER BY THE HAULAGE CAR



EVATION



THIS EQUIPMENT WAS DEVELOPED TO MEET THE EMERGENCIES OF WAR BUT IT IS NOW PROVING OF EQUAL VALUE IN PEACE

Digitized by Google

New European Service of The Marine Review

FRANCIS M. MANSFIELD
Editorial Representative in France

Shipping and shipbuilding have just become one of America's stalwart industries. New ships, new yards, new executives and new organizations have entered and are entering the marine field. This condition demands from the business paper serving the marine field, a broadened service. For that reason, "The Marine Review," as announced below, is greatly expanding its European editorial and business facilities. The plan, as outlined, will give both American and overseas subscribers regular and complete information regarding the important steps in advance in shipping, shipbuilding and engineering practice, throughout the world.

PROVINCIALISM of the United States both political and commercial ended with the war. As American trade and industry are being affected profoundly by the new order of affairs, so an added responsibility and opportunity for service has been opened to the specialized publications of this field. In no major branch of American business has the international viewpoint become so defined as in the marine field. The greatly extended shipbuilding capacity in this country has rendered imperative a broad and last interest in overseas trade. Keeping step with the new conditions and mindful of its obligations toward the great industry which it represents, THE MARINE REVIEW has completed its plans more definitely to internationalize its scope and influence. A special European division of THE MARINE REVIEW and its affiliated publications of the Penton Publishing Co., is to be created, with headquarters in London. From there will be directed the editorial and business activities covering Great Britain and continental Europe. The work of correspondents in England, France, Belgium, Holland, Scandinavia, Greece, Germany, and other maritime countries of Europe will be directed from this office. In this way a system of close editorial supervision in accordance with American standards and interests will be provided. As a consequence THE MARINE REVIEW will be afforded a European representation superior to any publication in its line and unequaled by that of any other business paper in this country. It will be enabled to present improved charter market reports, technical development, industrial news and other editorial matter of a business character with the same completeness and authority which has marked its treatment of these subjects in this country. H. Cole Estep who has been made manager of the European division has been prominently identified with the staff of THE MARINE REVIEW since 1908. His experience has included many years of study and of close contact with both the commercial and technical branches of the American shipbuilding and ship operating, iron and steel and metal working industries. A graduate engineer, he has filled for many years the posts of associate editor of THE MARINE REVIEW and engineering editor of *The Iron Trade Review* and is especially fitted to represent and interpret the development of European production and manufacturing practice in the reconstruction period. He is author of "How to Build Wooden Ships," an authoritative textbook. He sailed Nov. 1 for England to open the new division headquarters. He will make his residence in London, with offices at the Dorland House, 16 Regent street, London, S. W. I.

H. COLE ESTEP
Who Will Represent THE MARINE REVIEW in Europe

JOSEPH HORTON
Editorial Representative in Great Britain

Joseph Horton of Birmingham, England, remains as British correspondent. Francis Miltoun Mansfield, who is now preparing a series of articles on French, Belgian, Italian and German shipping and shipbuilding conditions, will continue as French editorial representative. Various additions to the European editorial staff will be made, so that the activities of every maritime country and section will be brought before the readers of THE MARINE REVIEW.

Digitized by Google

How Modern Ships Are Painted-I

Selection and Preparation of Materials is of Essential Importance—Why Special Attention Should be Given to Pigments, Solvents and Driers

BY FRED B. JACOBS

PAINT as applied to vessels serves a double purpose. It forms a moisture-proof coating which, if properly applied, effectually protects the material underneath from the action of the elements. Also it serves an artistic purpose as a well painted vessel is pleasing to the eye. Such a vessel is a credit to her owner as well as her master while a poorly painted ship, or one with huge patches of rust on her sides and upperworks, is mute evidence of slipshod operating methods.

Paint is without a doubt one of the most important items that enters into the construction and maintenance of a ship. This is especially true of iron or steel vessels for without the use of the protecting coat formed by properly applied paint, the vessel would speedily disintegrate from the action of rust.

The materials used by the ship painter are of several varieties. For painting steel and iron vessels, red-lead paint is used almost exclusively for the under coats. The bottoms of vessels are painted with antifouling paint to protect the skin from marine growths and in the case of wooden vessels from the ravages of toredoes, or ship worms, which are especially active in tropical waters. For painting the upper works, white-lead paint is often used, especially for outer coats as this material has greater covering capacity than red-lead paint. Canvas deck and house coverings are primed with oil and painted with white-lead paint while a variety of finishes are used for interior work. These consist of shellac, varnish and interior paint, the latter often having a zinc base. Special paints are employed for funnels and other surfaces exposed to heat. Thus it is evident that ship painting is a complete trade in itself and if the best results are required, too much care cannot be exercised in the proper selection of materials and methods of application.

As it is desirable for those handling and using paints and other mediums used in finishing vessels to have a practical knowledge of paint, a brief description of the several commonly used materials will prove of interest.

Paints, as used on ship work, consist of four component parts called the base, vehicle, solvent and drier. The base is, in many respects, the most important part of any paint. One of the commonest bases used in ship paint is red lead. Metallic lead has two oxides, litharge and red lead. When metallic lead is melted and exposed to the air it absorbs oxygen and the scum that forms on the surface of the molten material is known as litharge, the chemical formula for which is PbO. Litharge is yellow in color and when it is again roasted in contact with air at the correct temperature it absorbs more oxygen and turns red. The product is now known as red lead with the chemical formula of Pb_3O_4. Red lead contains a third more oxygen than litharge and while the latter is easily decomposed the former is quite durable.

Too much cannot be said on the proper selection of red lead for ship use. Some 40 years ago, red lead containing but 60 per cent of true red lead with 40 per cent litharge was considered as standard. The quality has been gradually raised, however, and while red lead containing as high as 30 per cent litharge is occasionally found on the market, it is possible to obtain better material if quality is insisted upon. Red lead should be inspected for quality and as this is a simple operation, there is no good excuse for not doing so. A. H. Sabin, who has made an exhaustive study of red lead gives the following method for testing this material:

"A gallon of water weighs 8.33 pounds while a 100 cubic centimeter flask contains 100 grams of water. If such a flask is filled with paint and weighed, the number of grams is the specific gravity of the paint. When this is multiplied by the constant 8.33, the quotient is the weight of a gallon of the paint. All the inspector needs is a 100 cubic centimeter flask and some small scales with gram weights. It takes but a few minutes to make the test anywhere. As red lead is the heaviest pigment, any adulteration will show lessening of weight."

To inspect the oil in a sample of paste red lead a small amount can be dissolved out with ether. If this dries like linseed oil with a similar odor it is fairly certain to be linseed oil. Mr. Sabin points out that the only adulterant he has found with linseed oil as applied to red lead is a fish-oil soap which has a repugnant odor while the extracted sample does not dry like linseed oil.

Red lead containing an excessive amount of litharge is sure to cause trouble. This material acts on oil at ordinary temperatures which causes the paint to become ropy. If it is allowed to stand it will eventually solidify. Again, such a paint is sure to contain coarse particles which cause the paint to "run" when applied. Government-standard red lead must contain 94 per cent pure red lead with not more than 6 per cent residual litharge. This standard was adopted during the year 1908 by government engineers. However, if this material is allowed to stand too long

How Costs Are Reduced

WHILE the art of applying paint as a means of preserving wood and other surfaces is as old as civilization itself, it is only within the last decade that mechanical means have been devised to replace the slow and costly process of applying paint by means of the manually operated brush.. When it is realized that it takes approximately 10 tons of paint to cover an ordinary cargo vessel, the importance of methods to reduce the labor of applying paint are readily appreciated.

Efficient painting calls for the careful selection of materials which should be properly applied. The first coat especially is the most important as it is the initial effort effectually to seal the surface underneath from the destructive action of the elements. If the first coat peels off, it is obvious that it will carry subsequently applied coats with it and for this reason the importance of applying the first coat effectively should not be overlooked. This article presents a study of paint, its ingredients and approved methods of application.

Digitized by Google

in oil it thickens and eventually hardens. A theoretically correct formula for making up red lead paint is as follows:

Red lead, lbs	20
Raw linseed oil, pints	5
Petroleum spirits, gills	2
Drier, gills	2

This material makes one gallon and weighs 25 pounds 4 ounces.

If allowed to stand this material will harden as the red lead is precipitated but any first class paint manufacturer can supply red-lead paint having no injurious ingredients that will remain in a liquid state for many months.

Iron oxide, Fe_2O_3, is sometimes used as a base for marine paint. This material is obtained as a steel-gray crystallized powder by igniting the oxide of any ferric salt containing a volatile acid. Small crystals are formed by passing ferric chloride over heated lime. When finely ground, these crystals yield a brownish red powder. There is some authority for the use of this material based on the strength of the claim that since it is used in connection with iron or steel, it is impossible for a galvanic couple to be formed between the paint and the vessel's underbody. White lead is another by-product of metallic lead and is prepared for the painter in several ways. The one most commonly used, the English method, is in brief as follows: Sheet lead in coils is placed in jars with dilute acetic acid, the jars being placed in stacks and surrounded with fermenting tanbark. After about three months, the lead is removed and put through a purifying process. The whole process is slow but productive of white lead of excellent quality. The white lead of commerce commonly contains 75 per cent carbonate of lead and 25 per cent lead hydrate. It is generally supplied to the painter in paste form mixed with 6 to 7 per cent by weight of linseed oil. White lead is an easy material to adulterate as it cannot be tested without elaborate laboratory apparatus. The chief adulterant used is sulphate of baryta.

White zinc, which is made in much the same manner as white lead, is used for interior ship painting as it possesses the quality of permanency, is not expensive and is easily applied. White zinc, however, is not as desirable for exterior painting as white lead.

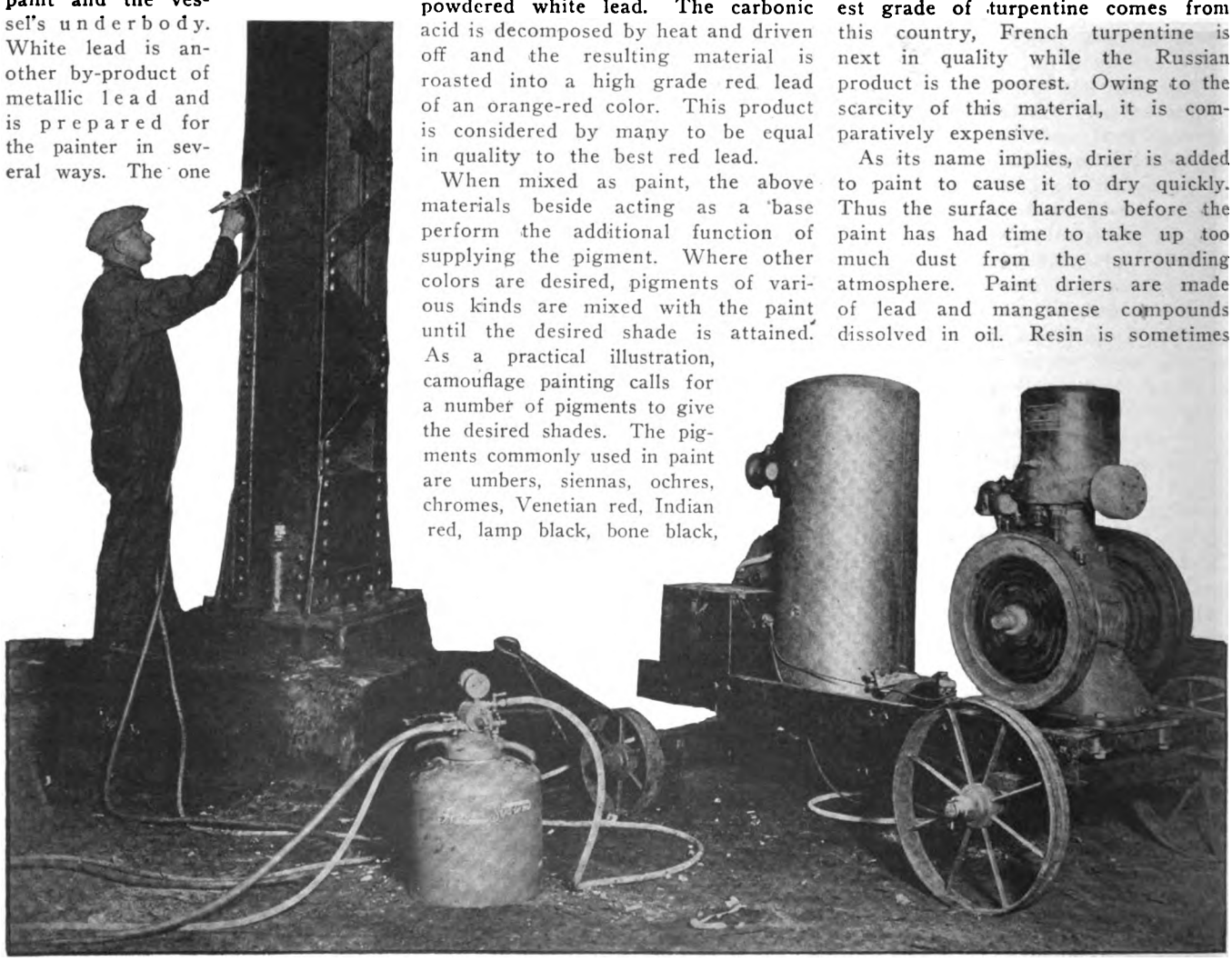
Orange mineral is a by-product of white lead made by roasting dry powdered white lead. The carbonic acid is decomposed by heat and driven off and the resulting material is roasted into a high grade red lead of an orange-red color. This product is considered by many to be equal in quality to the best red lead.

When mixed as paint, the above materials beside acting as a base perform the additional function of supplying the pigment. Where other colors are desired, pigments of various kinds are mixed with the paint until the desired shade is attained. As a practical illustration, camouflage painting calls for a number of pigments to give the desired shades. The pigments commonly used in paint are umbers, siennas, ochres, chromes, Venetian red, Indian red, lamp black, bone black, vegetable black, ultramarine, Prussian blue, vermillion, lakes and vandyke brown.

The most commonly used vehicle for ship paint is linseed oil. This material is extracted by hydraulic pressure from flax seed which has previously been heated. It has a transparent amber color and in this state is known as raw oil. It is much improved by keeping. "Boiled" oil is raw linseed oil heated to a temperature of from 350 to 500 degrees Fahr. in which state it is kept for about four hours. During the process driers are added. This material is thicker and of a darker color than raw oil. It drys quickly with a hard glossy coat which is less elastic than when raw oil is used.

Solvent is added to paint for the purpose of keeping it moist long enough to set flat and evenly. During the setting process, brush marks gradually disappear. The principal solvent used in ship paint is turpentine. This material, which is distilled from the sap of the pine tree, is derived from three sources, the United States, France and Russia. The highest grade of turpentine comes from this country, French turpentine is next in quality while the Russian product is the poorest. Owing to the scarcity of this material, it is comparatively expensive.

As its name implies, drier is added to paint to cause it to dry quickly. Thus the surface hardens before the paint has had time to take up too much dust from the surrounding atmosphere. Paint driers are made of lead and manganese compounds dissolved in oil. Resin is sometimes



HOW THE PAINT SPRAYING MACHINE IS USED TO ADVANTAGE IN THE SHIPYARD ASIDE FROM ACTUAL WORK ON VESSELS—PAINTING A COLUMN

Digitized by Google

added to drier but the use of this material is prohibited by specifications calling for high-grade material.

The materials above described are the ones commonly used in making ship paints. Aside from these a variety of materials are used for special purposes. Among these are antifouling paint for ships' bottoms. These generally contain copper and mercury. This paint is applied long enough before the vessel is launched to insure its drying properly. A special paint is also used for the boot top, that is, the section of the vessel which is immersed when the ship is loaded and out of water when she is light. As this part of the hull is alternately exposed to air and water a special paint made to resist the action of both these elements should be used. A special paint is also used for boiler fronts, funnels and other parts exposed to heat while piping is sometimes painted with aluminum paint.

Varnish and shellac are extensively used in finishing the interiors of deck houses, officers' quarters, staterooms, etc. Surfaces thus finished in natural wood are pleasing to look upon and quite durable if the finish is properly applied.

Varnish is a product made by dissolving various kinds of gums in oil and turpentine. The gums employed in making varnishes for hard wearing surfaces, as aboard ship, are amber, copal and gum anime. Varnishes made of these materials resist the action of the elements for a long time.

Amber is a yellow, transparent, and sometimes clouded, substance found on the coasts of the Baltic sea. Varnish made from this material is hard and durable and does not turn dark with age. Copal gum is found both in the West and the East Indies. It makes one of the most durable varnishes known. It is hard and tough and is much used in external work. Gum anime is a variety of copal found in the sandy soil of the East Indies. Varnish made from this material is hard and durable and dries quickly. Unless the varnish is carefully made, however, it is liable to crack.

There are many grades of cheap varnishes used for interior work which are not durable when compared with the better grades. Cheap varnishes are made from soft gums such as dammar, common resin and mastic. Inferior varnishes should not be used aboard ship under any conditions as they are short lived. The driers used in varnishes are generally acetate of lead and litharge. Care should be used in adding drier to varnish, however, as an excess of this material causes the finished surface to crack and chip readily.

Shellac is often used in marine work as it forms a good undercoating for varnish. This is one of the most curious materials with which the painter has to deal. Contrary to the generally accepted opinion, shellac is not a vegetable gum but a secretion from certain little insects, *Coccus Lacca,* which infest the branches and twigs of certain trees growing in the East Indies. The material as deposited by the insects is technically

DECK FITTINGS ARE OFTEN PAINTED BY HAND

termed lac. Much of it is gathered in Bengal, Pegu, Siam and Assam. Lac as gathered is known as stick lac. This material is crushed and washed in hot water, the material resulting being termed seed lac. Shellac of commerce is made by melting seed lac and straining it through canvas. This material runs from dark amber to almost black.

What is technically called white shellac is ordinary shellac bleached. This is accomplished by dissolving it in boiling lye and passing chlorite through the solution until all the product is precipitated. White shellac is the kind generally used in marine work as it gives an almost transparent coat which is the result generally desired. Shellac is prepared for use by grinding it into small particles in a mill followed by mixing it with alcohol as a solvent. Formerly grain alcohol and cologne spirits were used as a solvent but at the present time wood alcohol is used almost exclusively. Wood alcohol is comparatively cheap and its use as a solvent for shellac is said to be productive of excellent results. Wood alcohol is a poison and for this reason care should be used in handling it. Taken internally it produces blindness or death. Thus, as a measure of safety, containers of this material should be marked with a skull and cross bones.

(To be concluded)

October Lake Levels

The United States lake survey reports the monthly mean stages of the Great Lakes for October, 1919, as follows:

Lakes	Feet above mean sea level September	October
Superior	602.55	602.47
Michigan-Huron	580.81	580.63
St. Clair	575.61	575.39
Erie	572.75	572.50
Ontario	246.86	246.35

Lake Superior is 0.08 foot lower than it was in September, 0.04 foot higher than a year ago, 0.15 foot below the average stage of October of the last 10 years, 1.09 feet below the high stage of October, 1869, and 0.89 foot above the low stage of October, 1879.

Lakes Michigan and Huron are 0.18 foot lower than it was in September, 0.54 foot lower than a year ago, 0.19 foot above the average stage of October of the last 10 years, 2.31 feet below the high stage of October, 1876, and 1.03 feet above the low stage of October, 1911. During the last 10 years the October level has averaged 0.2 foot lower than the September level, and 0.2 foot higher than the November level.

Lake Erie is 0.25 foot lower than it was in September, 0.20 foot higher than a year ago, 0.42 foot above the average stage of October of the last 10 years, 1.20 feet below the high stage of October, 1885, and 1.70 feet above the low stage of October, 1895. During the last 10 years the October level has averaged 0.3 foot lower than the September level, and 0.3 foot higher than the November level.

Lake Ontario is 0.51 foot lower than it was in September, 0.35 foot higher than a year ago, 0.57 foot above the average stage of October of the last 10 years, 1.46 feet below the high stage of October, 1861, and 2.68 feet above the low stage of October, 1895. During the last 10 years the October level has averaged 0.4 foot lower than the September level, and 0.2 foot higher than the November level.

The 4-mast schooner EDISON E. BULLARD, Capt. John Van Heuvel was nearly destroyed by fire 12 miles off the mouth of the Mississippi river, late in October.

Digitized by Google

France Now Building Many Ships

French Canals to be Improved—Hamburg-American Plans—Shipbuilding in Australia—Arctic Shipping—Launches Destroyer

THE French Naval League recently announced that losses of French merchant vessels during the war were 1,500,000 tons, two-thirds of the total tonnage of the nation previous to hostilities. In the face of these losses France is dependent at the present time on foreign bottoms to handle her commerce. Efforts, however, are being made to rehabilitate the French merchant marine.

Two 8000-ton deadweight steamers were recently launched from the yards at Dunkirk. These two vessels, the PARIS and the FRANCE, will be employed in the transatlantic trade.

The smaller shipbuilding plants and the government works at Brest are working under high pressure. Their efforts are hampered, more or less, by labor shortage as well as by an existing coal crisis.

The Chantiers Navals Francais recently contracted with the French government to deliver in 1920, six 3100-ton vessels, all of which will be employed in the coal trade in England. Since the armistice the Societe des Chantiers Navals de l'Oeust has launched several small ships for the coast trade and at the present time is under contract to build a small fleet of standardized fishing steamers, of which France is sadly in need.

The Societe Normande de Constructions Navales, affiliated with the Creusot steel works, will build, for delivery in 1920, a number of 6000-ton cargo vessels. To further increase its activities this company is at the present time engaged in fitting up its yard at Cherbourg.

The Chantiers de Construction Navales de la Basse Loire, one of the oldest French shipbuilding companies, is expected to play a big part in the shipbuilding revival. This yard was only recently released from government requisition.

Improves French Canals

Improvements are to be made to better navigation of the River Seine. New barrages are to be built at Andrésy, Méricourt, Villez-Notre-Dame, la Garenne, and Poses, and the barrage at Meulan is to be abolished. New locks, 657 feet long, are to be built at each of the falls. The Nord canal is to be constructed so as to take 600-ton barges instead of only 300-ton boats. By the Nord and St. Quentin canals coal from the department of the Nord will then be brought near to Paris. The Rhône-Rhine canal is to be enlarged so that 300-ton barges may navigate its whole length. At present barges of this size cannot pass beyond Deluz, near Besançon. When the new construction work is complete, waterway communication between upper Alsace and the rest of France will be fully assured, and the transport of potash will be facilitated.

Hamburg-American Plans

According to K. M. Faber of K. M. Faber & Co., Hamburg, the Hamburg-American line has made no plans for re-establishing its services. He stated that the line at the present time was acting as freight broker for the Kerr Steamship Co. and the Pacat Steamship Corp. at the German port.

"There is no chance for the Hamburg-American or the North German Lloyd to re-enter the steamship business until they acquire some ships," Mr. Faber said. "It is generally understood that the Ebert administration will ask the allies to restore some of the former German vessels to these lines in order that it may start up production. Reports that have been current as to the consolidation of the Hamburg-American line with American shipping companies are, I am sure, unfounded."

Ship Work in Australia

During the past season, the DUNDULA, a 5500-ton cargo carrier, was launched at Cockatoo island, Sydney, Australia. She is of the single-deck type with long bridge amidships and is the third steel vessel of her class to be built in Australia on order of the government. Delay was encountered in building the DUNDULA through slow deliveries of material from the United States, it is said. In her construction, 1460 tons of steel were used of which amount 876 tons was of Australian manufacture.

She is powered by a triple-expansion engine with cylinders 25 x 41 x 68 inches diameter and 45-inch stroke. The engine develops 2200 indicated horsepower. Steam is furnished by three watertube boilers having a combined heating surface of 8289 square feet. Her auxiliaries include a condenser with a cooling surface of 2600 square feet, feed pumps, ballast pumps and a 25-ton evaporator.

In the Australian house of representatives it was stated that 14 wooden ships have been built in America for the Australian government; four by the Sloan Shipyards Corp., Olympia, Wash., and 10 by Patterson & MacDonald, Seattle. The Sloan ships cost about $2,400,000. It is announced that these ships are being resold in America at a loss.

Arctic Shipping

Before the war, the Russian government planned to supply the Arctic coast with the requisite arrangements for shipping. The Kolchak government has been negotiating with a Norwegian, Jonas Lied, with regard to restarting them. The Siberian government naturally attaches much importance to being able to obtain an outlet to the ocean via the Arctic and so to make itself independent of the route through Russia.

The government intends to establish five new wireless telegraphy stations on the Arctic coast and to erect lighthouses and other navigation marks in the estuaries of the Ob and Yenesei. At the mouth of both rivers, large warehouses have been built. In this way it will be possible to store large quantities of goods when their transport by river vessels is for the time unfeasible. A small harbor is being constructed on the west coast of Nova Zembla, in which an ice breaker will be stationed. It was arranged that 15 steamers, carrying 50,000 tons of goods, were to leave England and America for Siberia this year. (*Hansa.*)

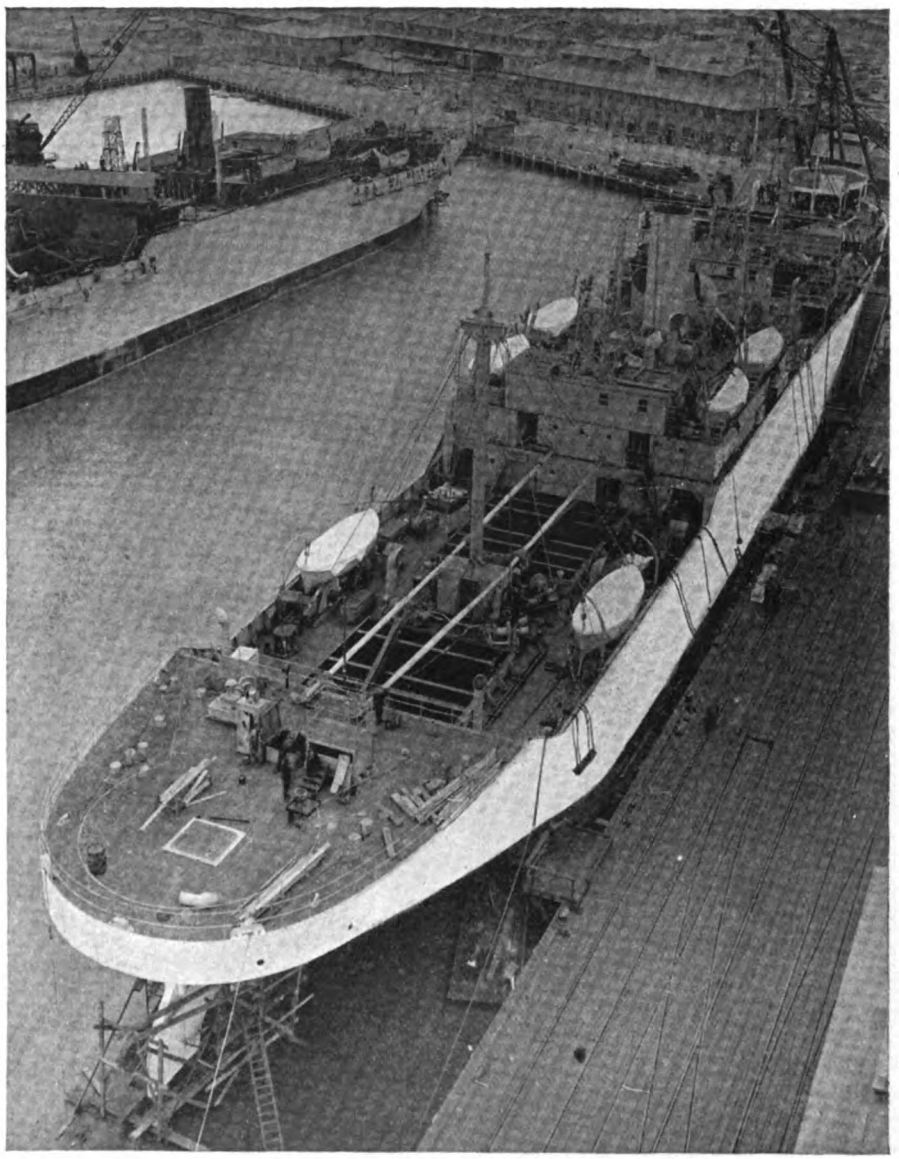
Launches Destroyer

The WITHERINGTON, a W-class destroyer, recently was delivered to the British government by J. Samuel White & Co., East Cowes, Isle of Wight. The keel of this vessel was laid in July, 1918, and she was launched last January. She is of 1450 tons displacement and develops 28,000 shaft horsepower. Her speed is 35 knots an hour. She has turbine engines and oil-fired boilers. Her armament consists of superimposed guns, fore and aft, antiaircraft high-angle guns and triple sets of torpedo tubes placed amidships. She is the seventy-first torpedo boat to be built by the White company. Her trial trip was entirely satisfactory.

Digitized by Google

Log of the Prusa

BY V. G. IDEN



Getting ready for her maiden voyage—The Prusa at the fitting out docks, Hog Island

MUCH of the criticism of war-built American ships has been prompted by the jealousy of foreign interests. Passengers crossing the Atlantic today are not unacquainted with the freedom of speech of some of the skippers who fly some other flag than the stars and stripes over their taffrail. This kind of talk was heard during the fall of 1918 immediately following the armistice. Then, as now, some of these mariners of other nations prophesied that the ocean will be strewn with abandoned American ships. Their prophecies proved false during the severe storms of last winter, and their forecasts of what the coming winter will do to American shipping may be accepted with skepticism. War-built vessels may not be as good as ships built with more care in times of peace, but American war-built vessels are no worse than the war-built vessels of other nations.

In some respects the United States struck out along new lines of construction in order to put afloat a huge merchant fleet in a short time. It was a radical departure in ship construction to manufacture ships on the fabricated principle. The building of the Hog Island shipyard was a stupendous task, and THE MARINE REVIEW has described the engineering task involved, detailed the method of building those ships, and published the first detailed account of a trial trip. A completed record of the fabricated ship experiment is offered herewith: how these vessels perform in commercial use. Probably the severest test of endurance for this type of ship was encountered by the PRUSA when she sailed from Philadelphia in the early spring for Gothenburg, Sweden, with a cargo of packing house products.

Upon this voyage, the PRUSA was commanded by Capt. R. Svane under the banner of the Moore & McCormack Co., a shipping firm of New York. That the ship did not meet with ill fortune may be attributed to the fact that she was in good hands, for she certainly experienced one of the roughest Atlantic voyages on record. If the good performance of the PRUSA is to be attributed to the skill of Captain Svane, then the skipper's opinions in themselves should carry the more weight. "I am proud to be master of one of the Hog Island ships," said Captain Svane, "as the PRUSA is the best ship I ever went to sea in (loaded or in ballast), and I have followed the sea for 27 years, sailing in Danish, German, British and American ships."

The PRUSA was tied up at a dock at Port Richmond and on March 3 loading was begun. Ten winches were put to work, but the stevedores were stopped frequently, once for a whole day, by rain squalls. She was not ready for sea before March 11, at that time having a draft forward of 22 feet 9 inches, and aft of 23 feet 7 inches. At 9:50 a. m., March 12, when starting to sea, it was discovered the steering gear was not working properly, the port side steering engine being slow. Furthermore, a leak was discovered in the oil line. Sailing via New York, she passed quarantine on March 14. She proceeded to sea with her engines turning 80 revolutions per minute.

Two days later bad weather began. First there was a strong wind, accompanied by a rough sea. The sky was cloudy and overcast. The next day, March 17, there was snow and rain squalls with a rough head sea. The wind continued strong from the northeast, lashing up a rough head sea. The ship was spraying heavily forward, and she shipped tons of water both fore and aft. The wind increased to a strong gale and it was necessary to

Digitized by Google

reduce to half speed on account of shipping so much water. On March 19, with this kind of weather continuing, the ship was rolling and pitching heavily and the engines made but 46 revolutions. The following day she speeded up to 68 revolutions, passing the British steamer, ASSEIN, steering northeast, three-quarters east.

This kind of weather continued until on March 24, the wind reduced to a fresh breeze. There was a heavy northerly swell. It was possible for the engines to make 80 revolutions. For some time it was necessary to steer with the steam gear while making repairs to the telemotor. The telemotor was of the hydraulic type, and at five bells that morning it was necessary to stop the engine to regulate the steering engine and telemotor. This work required 72 minutes, after which the PRUSA proceeded full speed ahead.

The light breeeze and heavy northerly swell continued for two days. On March 26 there was a southwest breeze with rain following. Rain and hail squalls were encountered but the PRUSA made 82 revolutions. During the afternoon she ran into a strong gale of wind which hauled from west northwest to north northwest. There was a high following sea and it was necessary to use oil bags on the port side of the ship. She began to roll and labor heavily, and to ship considerable water. The engine speed was reduced to 79 revolutions.

At noon on March 27, Captain Svane hove his ship to. The engines were turning slowly. An oil barrel on the boat deck came adrift and smashed one end of a life raft. The cylinders were carried away, the rail and three full barrels were lost. The tarpaulins on Nos. 4 and 5 hatches were badly damaged. The ship was pitching and laboring heavily in the strong gale and the situation was threatening. Seaman E. Hoffman was badly hurt trying to secure the barrels. That afternoon the ship ran into snow squalls.

The next morning it was necessary to stop the engines for 50 minutes for repairs. Again, later in the afternoon, another 25-minute stop was made in order to pump up the telemotor steering gear. March 30 brought snow, hail and rain. About noon Ramna Stacks was sighted abeam 8 miles off. During the afternoon Muckle Flugga lighthouse was sighted. The wind and sea began to moderate, although the snow squalls continued. On March 31 Hilleso lighthouse was sighted, but that morning it was necessary to stop the engine again on account of the steering gear. That evening Rundsten lighthouse was abeam, and early in the morning of April the PRUSA anchored off Lervig.

A successful crossing of the Atlantic had been made. The pilot came aboard and proceeding under his orders the PRUSA struck a submerged obstacle at 7:48 a. m. She struck first under No. 2 hold, then under the engine room and again under No. 4 hold. Soundings were taken ever hour thereafter. No. 4 well was found to be full of fuel oil and gaining rapidly. The pumps were started but they could not take the oil out. It was discovered that No. 5 starboard tank was losing fuel oil. A few minutes thereafter the ship anchored in Christiansand harbor, and two hours after the customs officials came aboard.

On April 2, while getting up anchor, the shackle started to spread while entering the hawse pipe. The anchor was secured to bitts on the forecastle, and the vessel started ahead under pilot orders. The Gothenburg pilot came aboard and at 4:30 p. m. the PRUSA arrived at her voyage end, making fast to a buoy. The draft forward was 20 feet 6 inches, and aft 22 feet 4 inches. April 3 the survey officers and Lloyd's inspector came aboard. The next day the stevedores turned to and unloading began. While the unloading continued the crew turned to, cleaning oil off the ship's sides and painting the outside. On April 8 she went alongside a dock and continued unloading.

Due to the heavy weather the crossing of the Atlantic was unduly prolonged. The distance was 3800 nautical miles, and the PRUSA had made an average speed of but 9 knots. An examination made on April 12 showed water in No. 1 hold. Soundings showed 2 inches in the bilge and 17½ inches over tank tops around the cargo. It was concluded that the leak was started when the ship struck the submerged object on April 1. April 14 the piston broke on No. 2 hatch starboard winch. The winch was repaired, and the strainers in No. 2 bilge were cleared. The stevedores did not finish unloading until April 17. The next day a pilot came aboard and the ship anchored once more out in the harbor. Sunday, April 20, the carpenter turned to and made the ship ready for drydock.

Hull is Inspected

On April 21 she drydocked, and was inspected by Lloyd's. It was found that 14 plates had been dented. The damage on the ship's bottom extended from frame 84 to 161. Lloyd's inspector advised but temporary repairs. These were completed and the PRUSA left drydock on April 24. The draft forward was 10 feet 6 inches, and aft 15 feet. She started for sea again on April 27.

The next day Lister light, Norway, was sighted ahead when snow squalls were encountered. The sky was overcast, and there was a moderate northeast breeze. That afternoon the PRUSA dropped anchor in the harbor of Lervig and filled her deep tanks. The next day she proceeded to Holmengraa, sent the pilot away and headed for the sea. Shortly after noon a floating mine painted red was passed. This was in latitude 60 degrees 55 minutes north, and longitude 3 degrees 10 minutes east. There was a fresh westerly wind and the sea was rising.

On April 30, with the weather clearing, following rain squalls, the wind hauling ahead, a boat drill was held. Then followed a westerly breeze, rain squalls and a rough head sea. The PRUSA's engines made 91 revolutions notwithstanding. May 1 was marked with cloudy weather and a moderate northwest gale, rain squalls and rough sea. She was then entering the North channel on a following sea. May 2 the weather was fine and clear and that afternoon the ship entered the Manchester canal. With pilot aboard, the topmast was removed and the vessel proceeded up the canal. On May 3, she docked at Manchester and filled her oil tanks. The next day she proceeded to sea.

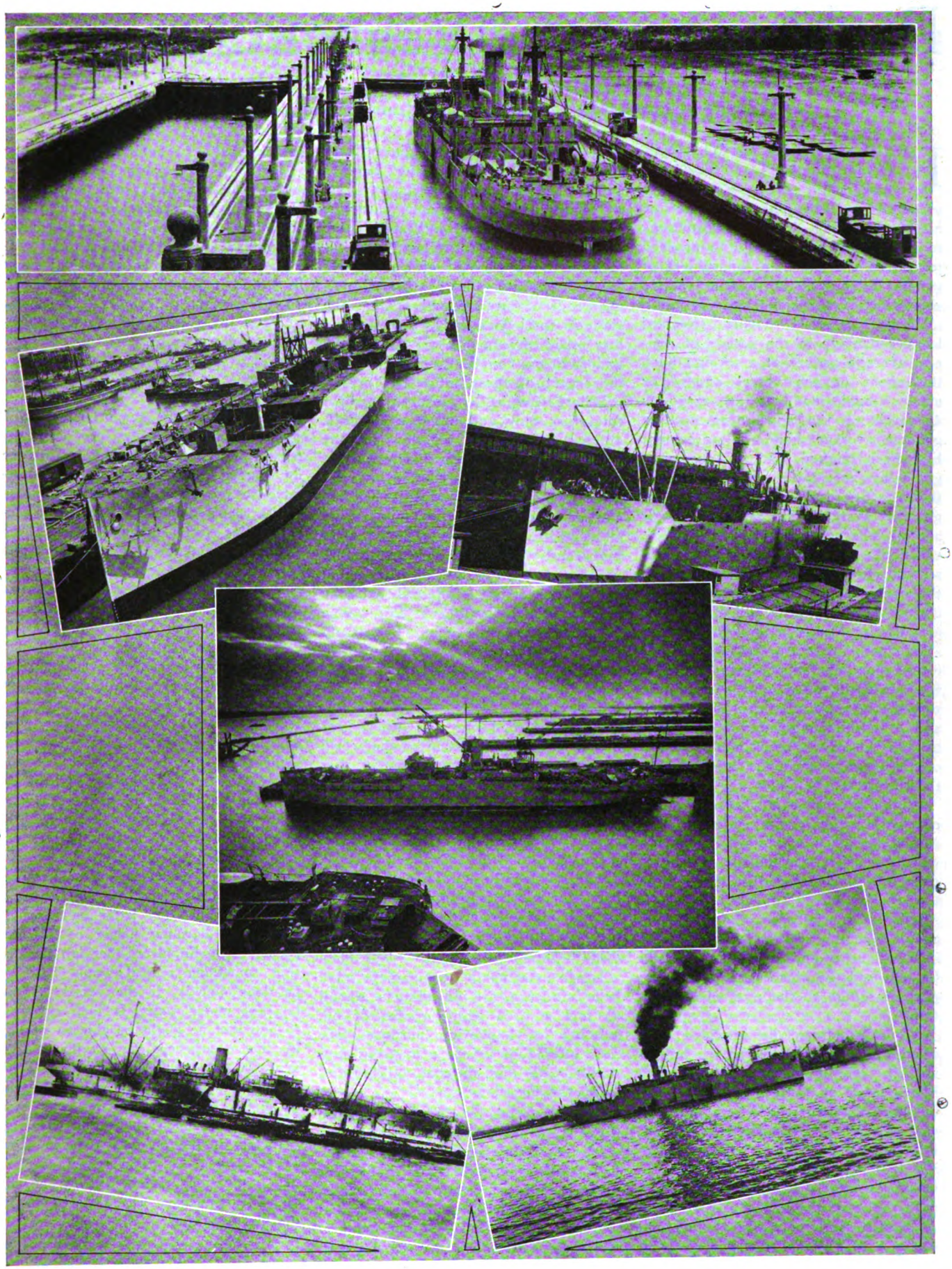
From Manchester to New York is some 4000 nautical miles. The PRUSA made the return trip in ballast, encountering weather which was equally as difficult as that encountered during the trip over.

On May 9, veering winds were encountered. These kicked up a cross sea. The wind hauled south southeast. As the barometer was falling, everything was secured for bad weather. That afternoon the ship began to roll and pitch, and she shipped water fore and aft. A heavy head sea was running. The next day there were west southwest gales and the same weather continued. A slight rise in the barometer was noted about noon and that evening the weather began to clear. The following day the engine speed was increased to 80 revolutions.

The good weather was but of short duration. On May 12, the PRUSA encountered northwest gales and a heavy rain. She labored in a head sea, rolling heavily. On the morning of May 17 the lead was hove in 38 fathoms. The bottom showed gray sand with black specks. The fog was then heavy.

On May 18, Fire Island lightship was sighted abeam 4 miles away. The weather became fine with smooth sea, although there was rain and a westerly breeze. Early that morning, Ambrose light was sighted abeam. At eight bells the pilot was aboard, and at 10:20 a. m. the doctor came aboard. Later the customs officers boarded her, and before noon the PRUSA anchored in Gravesend bay. That afternoon the immigration officer came aboard, and a memorable voyage of a fabricated ship was brought to an end.

Digitized by Google



FABRICATED SHIP IN PANAMA CANAL ENROUTE TO SOUTH AMERICA IS SHOWN IN TOP VIEW—BELOW ARE ILLUSTRATED SEVERAL DAYS IN THE PRUSA'S LOG—THE CENTER AND UPPER LEFT VIEWS SHOW HER FITTING OUT AT HOG ISLAND WHILE IN THE UPPER RIGHT ILLUSTRATION SHE IS TAKING ON CARGO AT PORT RICHMOND, PHILADELPHIA—SHE IS STEAMING AWAY FROM HOG ISLAND FOR HER TRIAL TRIP IN THE LOWER RIGHT ILLUSTRATION AND AT THE LOWER LEFT SHE IS SHOWN IN GOTHENBURG HARBOR, SWEDEN

Digitized by Google

Problems of the Vessel Operator

Marine Insurance Data for Policy Holders—Oil as a Bunkering Medium—Converting a Surface Condenser into an Oil Cooler

FRANK B. HALL & CO., INC., average adjusters and insurance brokers of New York, have prepared two pamphlets on marine insurance giving detailed instructions to holders of policies how to proceed to collect a claim. On the subject of general averages, the instructions to shipowners are specific and pertinent.

Where a vessel having sustained loss or damage in the nature of general average arrives at a foreign port, the agent of the vessel and / or master must see that no cargo is delivered to the consignees until a general average bond or agreement has been signed and a guarantee given by acceptable underwriters or their agents, for the payment of all general average, salvage and / or special charges, or until a deposit sufficient to cover what they will amount to has been collected from the consignees. The adjusters should always be consulted, and if possible attend to these matters themselves.

In cases where a vessel has put into a port of refuge, being short of fuel, water or provisions, a statement signed and sworn to by the master and / or chief engineer, of the quantity on board at the commencement of the voyage must be furnished to the adjusters.

Where the cargo is necessarily discharged in the general interest, care should be taken to note any damage which may be sustained in consequence of this forced discharge. While the cargo is out of the vessel, it should be specially covered by insurance. General average disbursements incurred at a port of refuge should be covered by insurance from the port of refuge to the port of destination.

Adjusters should be provided with a copy of the charter party, bill of lading, manifest, general average bonds and guarantees and all disbursement vouchers. Where the general average has consisted in putting into a port of refuge, the adjusters should be provided with a list of the master, officers and crew, together with the monthly wages paid to each. A detailed statement of the fuel and engine stores consumed in bearing away for and while at the port of refuge should also be provided. Where the vessel's engines have been worked in order to float her, particulars of the coal and engine stores consumed in working the engines should be provided.

Policies on disbursements, earnings, advances, profits and increased value are usually made to follow hull policies in the settlement of claims. As a rule, the interests are insured policy proof of interest and against the risk of total loss only, and a total loss paid by a majority of hull underwriters constitutes a total loss in respect of these interests.

Where freight is insured against total loss only and under a P. P. I. policy, claims are handled in the same way as claims on disbursements. Where freight is insured with average conditions and a partial loss has occurred, it is necessary to support the claim with a copy of the charter party and / or bill of lading together with a statement showing the actual amount of freight collected and the amount which has been lost. The cause of the loss should be clearly brought out in the master's protest.

Oil Bunkering

Upward trend in coal prices for bunkering purposes all over the world has caused the principal British passenger steamship companies seriously to turn their attention toward oil as a bunkering medium. Several of these companies, it is stated, will make ventures in this line in 1920. While no definite announcements have been made, it is rumored that the Cunard line will convert the AQUITANIA into an oil burner and that other large companies will follow the lead.

Large steamship companies have been studying the advantages of oil as fuel and as many grades of oil, suitable for bunkering purposes, are now offered at prices comparing favorably with that of coal, oil burning is on the increase.

One drawback to oil burning is the belief held by some steamship companies that the production of oil fuel, in quantities suitable for bunkering purposes, may fall into a few hands, so that the market might rise against the consumer. On the other hand, if Germany again invades the Atlantic, her ships in all probability will be oil burners. This would be due partially to the fact that Germany at the present time does not control any coal deposits of sufficient size to be a factor in steamship operation.

With oil bunkering, the fuel can be carried in less space, in such places as double bottoms where coal cannot be carried due to the difficulty of getting it to the stokehold. Coal must be stored in side bunkers where it can flow downward by gravity. The space liberated by coal bunkers can be utilized to store cargo.

Condenser Cools Oil

In the dim past, some hoary-headed savant, who probably preceded the period of Benjamin Franklin's almanac by a good many years, uttered something to the effect that resourcefulness was a man's greatest asset. How generally this seer's assumption has been endorsed is unknown, but mariners and followers of the sea agree that the quality of resourcefulness must be called into play on the high seas as often as any other.

Recently the steamer ANOKA, bound for New York from Hawaii, encountered warm water on a large part of her journey. The log book showed temperatures of 88 degrees day after day. Due to the fact that she was equipped with only one cooler, it was found to be exceedingly difficult to keep the lubricating oil in a sufficiently cool state. Oil going through this solitary cooler registered only one degree decrease in temperature.

As the oil increased in temperature, so did the bearings of the ANOKA'S turbines. When the latter had ascended to the alarming height of 164 degrees, Chief Engineer Sheridan decided that something radical would have to be done quickly, if the vessel was to be kept under way. It then occurred to him that he might be able to employ in the emergency the auxiliary condenser which the engines carried. With the aid of his tools and a few lengths of piping the transformation was soon complete and upon application the temperature of the oil was reduced from 124 to 103 degrees. The vessel reached her destination without further mishap and the condenser was restored to its original condition.

The yard of the Foundation Co., Tacoma, Wash., is being dismantled as rapidly as possible. Lumber and machinery are to be sold at auction.

Digitized by Google

New Ship Bills Before Congress

Proposals for Permanent Policy Engage Attention of Senate and House—Definite Enactments Expected from New Congress

By Washington Staff Representative of The Marine Review

PROGRESS is being made toward a comprehensive program of legislation to establish a permanent American merchant marine. Senator Jones of Washington, chairman of the committee on commerce, has introduced bills proposing alternative plans for a fleet; Representative Greene of Massachusetts, chairman of the house committee on merchant marine and fisheries, as has been stated in these columns previously, has prepared a bill, which is undergoing some revision, and Senator Ransdell of Louisiana, president of the National Merchant Marine association, has prepared a bill outlining a general shipping policy. In addition to the foregoing steps, Chairman Payne of the United States shipping board has given his views as to a merchant marine program before the house committee and they have been concurred in by other members of the shipping board who appeared before the house committee.

The plans of the shipping board and those incorporated in the bills mentioned are largely similar and give encouragement for the hope that actual legislation to build up a merchant marine may be passed during the forepart of the next session of congress. All of the proposals call for private ownership and operation of a fleet, except where the government may operate ships to open new trade routes, and maintain jurisdiction in certain respects, such as those relating to rates, etc.

The first bill of Senator Jones, which relates to the actual merchant marine policy, provides that the United States shall have a merchant marine sufficient to insure safety in time of emergency, so far as merchant ships can do so, and also sufficient to carry the greater part of our commerce, together with ample shipbuilding and repair plants, all ultimately to be owned and operated by private parties and capital.

Section 2 creates a corporation entirely separate and distinct from the shipping board, with nine directors to be appointed by the President from the different sections of the country for a term of eight years. This corporation continues for 30 years unless otherwise provided by law, and has all the powers of a private corporation for the accomplishment of the purposes of its creation. It has no capital stock, but there is transferred to it all the ships of the United States acquired as a result of the war and all the ships, shipyards, property and assets of the shipping board and the Emergency Fleet corporation, which shall constitute its capital. It is authorized to use this capital in any way that it deems best to accomplish the purposes of the act. All the contracts and liabilities of the shipping board and the Fleet corporation will be taken over by it. It is empowered "to construct, equip, repair, maintain, operate, sell, lease, charter, exchange, or otherwise dispose of vessels of the United States; and issue and deal in maritime securities, make contracts, acquire, hold, and dispose of such other property, both real and personal, as may be necessary and convenient for corporation purposes, and to establish and maintain, within and without the United States, port, terminal, and warehouse facilities and coal or oil bunkers or stations for use in connection with our merchant marine, and to do any and all things deemed by it necessary to develop an adequate American merchant marine composed of ships of suitable types, speed, etc." Briefly, it is proposed to place in control of this corporation, whose directors shall be men of the highest standing and largest business experience, ships, shipyards, and assets which cost about $3,000,000,000, for the purpose of accomplishing a definite, declared object, and give them full authority to do with these assets a certain and definite thing.

Provision is made in sections 3 and 4 for the transfer to the corporation of the property and assets to be handled by it. Section 5 extends the coastwise laws to the Hawaiian islands, the Virgin islands, Guam, and the Philippines after six months from the passage of the act and directs the corporation to see that adequate service is maintained between the United States and these islands. This, it is held, will develop a large commerce with these islands and result in private capital taking over any steamship lines the corporation may have to establish and extending them to China and Japan.

Competition with established American shipping lines is prohibited by section 6, while section 7 makes the ships of the corporation subject to all the laws of the United States the same as private ships and section 8 provides for annual reports. Section 9 authorizes the interstate commerce commission and the shipping board to require connection between rail and water carriers and authorizes these bodies to establish through export rates over rail and water lines to encourage, develop, and increase American commerce.

Under section 10 it is made the duty of the shipping board to investigate and advise the corporation what steamship lines and postal service should be established and maintained between the ports of the United States and other world ports, together with an estimate of the cost of such postal service, and the type, size, speed, and other requirements of ships, and the corporation is authorized to establish such service as speedily as possible, although the discretion of doing so is left entirely with the corporation.

Section 11 requires the corporation to determine the need for ships between the terminal of the government railroad in Alaska and other ports, and furnish suitable service for it unless it can be done by private parties. Section 12 establishes the principal place of business of the corporation at Philadelphia. Section 13 repeals the emergency acts under which the present fleet of ships has been constructed, and makes unexpended appropriations available for the work of the corporation. Section 14 repeals sections 5, 6, 7 and 8 of the shipping board act, which authorized the construction, operation, etc., of ships and section 15 repeals certain acts relating to the coastwise and other emergency legislation.

Section 16 contains the common provision with respect to the effect of declaring unconstitutional any part of the act, and also declares that the specific enumeration of powers shall not exclude other powers embraced within general terms. Section 17

Digitized by Google

directs the President to take steps to abrogate the provisions of treaties of commerce that restrict American rights to impose discriminating duties on imports. Senator Jones said the act leaves the shipping board to do exactly what it was primarily intended to do.

Senator Jones' Second Bill

The other bill of Senator Jones expresses the views he has on the theory of the shipping board handling the ships and he said that if that should be the policy that should be adopted by the committee after further hearings, the suggestions will be of benefit.

"When the world war began," said Senator Jones, "we had 1,076,152 gross tons of shipping (in foreign trade) out of nearly 50,000,000 tons engaged in the world's trade. It was carrying only about 10 per cent of our foreign commerce. Then was brought home to us the need of a great nation for a merchant marine. Foreign shipping upon which we were dependent was taken for war purposes. Our products and goods could not be exported for lack of ships. Charter rates became excessive, many of our industries were prostrate, and our people were threatened with ruin. Th loss actually suffered was more than would have been required to secure an adequate merchant marine under proper government encouragement.

"When we entered the war in 1917 our foreign tonnage had increased to 2,191,715 tons under the impetus of war needs. Then it was that our prospective coastwise policy was fully justified. It is safe to say that the war was really won by our coastwise merchant marine, which then amounted to 6,277,934 tons. Many of the best ships available for transporting troops, munitions, and supplies were coastwise ships which we would not have had except for the policy followed for the protection of our coastwise shipping from foreign competition. It saved us and the allies from defeat, or helped us to an early victory."

Senator Jones said that by the end of 1920 the United States will have, including its coastwise shipping, a merchant fleet of almost 18,000,000 gross tons, and about equal to that of the British empire. Of the 12,000,000 tons of shipping for the foreign trade that will be under the American flag by the close of 1920, said the senator, more than 8,000,000 will be owned by the government and paid for by taxes from the people.

"We may differ about government ownership," he pointed out, "but that can be no issue here. The government owns these ships, whether we will or no. They cannot be given away. The people will not stand for that. We must not allow private parties to take the cream of this shipping and let the government hold the balance to dispose of at a great sacrifice. Grant that government ownership should end as soon as may be; it must be brought about as nearly as may be without unnecessary sacrifice and just as a private individual would get rid of property he did not desire to keep but that he did not have to dispose of at a sacrifice. Furthermore, the government is interested in the future success of shipping and the maintenance of a permanent fleet. That object must be kept in view, and in getting rid of government ownership we must not try to sacrifice our property and must strive also to build up and put our shipping on a permanent basis. In fact, the ultimate purpose of our legislation should be the establishment of a policy under which an adequate merchant marine will be developed and maintained under private ownership and operation."

More Ships Must be Built

It was explained that no one can reasonably hope that private enterprise and capital, in the face of foreign competition and handicapped by our own inexperience, and lack of business connections and facilities, will be able to absorb and take over all this shipping in a short while and establish the routes that we ought to have. To serve our present needs, establish and maintain new lines, and develop the new markets, additional ships of special type, size, and speed must be built, said Senator Jones, who, stating that they would cost large sums of money, explained that some may be built by private capital, but, in his judgment, most of them will have to be built by the government. He said they can be built without new appropriations and as a part of a policy that not only will cost the government nothing but will help repay what already has been spent.

"Along with the ships we have we also have agencies to build the ships we need," the senator stated. "It is economy to use them, even if the additional cost of a ship may be a little more—which I very much doubt. At Camden, N. J., for example, the government has a plant for building the largest ships in the world with ways a thousand feet long. This plant has cost several millions of dollars, and for all practical purposes is a part of the New York Shipbuilding Co.'s yard. Unless private shipbuilding interests are ready to buy it and pay a fair price for it, the government ought to keep it and through the New York Shipbuilding Co. construct the ships that it ought to have for the construction of which there are probably no other existing facilities.

"The situation that confronts us is about this: We are comparatively inexperienced in financing, building and operating ships. We ought to have, for national safety and commercial success, at least 15,000,000 tons of shipping, to be maintained and increased as our trade grows, along with ample shipbuilding and repair yards. We will have this shipping by the close of 1920, with 8,000,000 tons or more of it owned by the government." The bill he prepared is intended to bring it ultimately into private hands, insure its maintenance and development to meet the needs of national safety and commerce, and at the same time return to the people the greatest part of their investment.

The house of representatives on Nov. 8 passed by a vote of 238 to 8 a bill providing for private ownership of an American merchant marine; taking away from the President control over the shipping board and centralizing authority and responsibility in that body; sale by the shipping board of all ships as soon as possible and long-term payments to aid in their purchase by private interests. The bill would repeal all emergency shipping legislation and cancel all the extraordinary powers conferred on the President with regard to the requisition of ships, wharves and other properties and would also repeal the power to control ocean freights and charters. After authorizing the sale of ships, extending payments up to 10 years, the bill directs the shipping board to accept mortgages and to discontinue shipbuilding so far as is consistent with good judgment, and not to make any further investments in new ships or plants. The measure also creates an American bureau of shipping for the classification of shipping after the manner of the British Lloyds.

To Establish Loadline

Another important part of the shipping legislation, said Chairman Greene, is the loadline bill which has passed the house, marking the depth to which ships may be loaded, thus adding safety to the vessels at sea.

The council of the National Merchant Marine association at a meet-

Digitized by Google

ing in Washington on Oct. 31 unanimously adopted resolutions calling on congress to enact legislation for the prompt sale of government-owned vessels. The association recommended that vessels of under 6000 tons deadweight be sold with privilege of transfer of flag, and that the larger ships be sold to American individuals and firms only. It also recommended that the entire fleet be sold within a period of two years. A bill carrying these principles has been prepared by Senator Ransdell, president of the association.

It was the opinion of the council that the shipping board should be directed to dispose of the entire government fleet, including the vessels obtained from Germany and those in the process of construction, and that purchasers of the larger vessels, whose sale is restricted to Americans, should be required to pay 25 per cent cash, the balance of the purchase price to be met by deferred payments over a period of 10 or 15 years, these deferred payments to bear 5 per cent interest, secured by first mortgages. The resolutions provide further that, after a sale of a portion of the larger vessels, the unsold remainder shall be allocated by the shipping board, as far as practicable, to those who have purchased, on the basis of payment of a commission to the operating firms or corporations and payment by the operators of the proportion of the consolidated net earnings of the ships owned by the operators and the government-owned tonnage which the operated tonnage bears to the total tonnage operated by such firms or corporations.

The association also recommended that those who purchase and operate ships in the foreign trade under this plan shall be exempt, with respect to the earnings of the ships, from all federal excess profit taxes for a period of from 10 to 15 years, provided they be permitted to charge off 10 per cent of the net earnings of the ships on account of depreciation and deduct such amount in their tax returns as operating expenses. The amount of the earnings equivalent to the excess profit tax that would be payable is to be invested in new tonnage, the products of American shipyards.

Finally congress is called upon to enact special legislation to assist existing passenger lines in the construction and operation of new passenger tonnage of the highest class and latest design and type and to inaugurate and develop additional passenger and freight lines on routes which it is desirable, in the national interest, that direct passenger and freight service should be established.

Condensed Reviews of Latest Books

Practical Shipbuilding, by J. D. MacBride; cloth, 231 pages, 5 x 7½ inches; published by D. Van Nostrand Co. and furnished by THE MARINE REVIEW for $2.

The author is superintendent of hull construction at the American International Shipbuilding Corp., Hog Island, Pa. He has written the present volume with the object of answering the many perplexing questions asked by those desiring to gain a thorough knowledge of shipbuilding.

The author is a practical shipbuilder of wide experience and his book is written from practical knowledge, wholly devoid of theory. He does not lay emphasis on what can be done but on the other hand he explains what has been accomplished.

The forepart of the book is devoted to shipyard organization wherein the work of various departments of a modern shipbuilding plant is described. The division of work about a shipbuilding plant is outlined and the duties of the various handicraftsmen explained. This section comprises 47 pages and states fully just what each division of men, erectors, riveters, holders on, caulkers, etc., do in building a modern steel vessel.

The chapter devoted to shipyard tools is complete and explains the uses of the various tools employed together with the kind of work on which they are used. This chapter contains many illustrations for ready reference which enables the apprentice readily to recognize the various tools with which he must become familiar.

A chapter devoted to shipways explains how they are built for end launchings, how the keel blocks are arranged, etc., and how the staging around the vessel is constructed. The subject of keels and keel laying is fully treated, followed by a description of shell plating. Frames, floors, tank tops; inner bottoms and peak tanks are fully described followed by a chapter devoted to the steam, stern post and rudder.

A chapter devoted to launching describes how vessels are sent into the water stern first or sidewise. This chapter contains much valuable knowledge on a little known subject. Full instructions for launching a vessel are included.

Several chapters follow which are devoted to engine rooms and engines, boilers, propellers, auxiliary machinery, piping systems and hull engineering. The chapter devoted to engine dock trial is interesting as it describes fully how the engines should be manipulated at their initial turnover.

A section devoted to ship nomenclature is included which is arranged in alphabetical order for the guidance of those wishing to familiarize themselves with the correct names for practically everything used in a shipyard or aboard a vessel. As a means of reference this section is of value. The book contains 158 illustrations, two of which show a cross section and longitudinal section of a poop-bridge-forecastle type of cargo vessel. The various parts are plainly marked with their names. The book is of convenient size for ready reference and will make a valuable addition to the library of those engaged in shipyard work or as junior officers aboard ship.

Opportunities in Merchant Ships, by Nelson Collins, 97 pages, 4¾ x 7¼ inches; published by Harper & Bros. and furnished by THE MARINE REVIEW for 75 cents.

In all probability, many thousands of boys in the United States nurse a secret desire to go to sea, either because they wish to "Jack London" about the world to seek adventure or because they wish, or at least think they wish, to make the sea their career. It is for the guidance of such boys that the present volume was written.

The author does not mince words or speculate in theories. In plain language he explains just what is expected of the green hand at sea, whether he ships on deck or in the engine room. The opportunities for advancement are explained as are also the hardships and disadvantages of sea life. Much technical information regarding trade routes, steamship companies, etc., is included. The book is interesting reading both for those desiring to go to sea and for others seeking a general knowledge of maritime subjects.

Digitized by Google

Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review
By Harry Bowne Skillman
Attorney at Law

IN THE case of *In re* John B. Rose Co., reported in 254 *Federal Reporter* 367, the court said that normally a vessel, once arrested and discharged, may not again be arrested for the same cause of action. The court, however, then added that there has always been a condition imposed upon the rule that if the stipulation was entered into improvidently or through fraud or mistake the court might order a new arrest. In the case at bar it appeared that some of the towage services each of which may have constituted a separate cause of action, being by separate contract, were omitted in the original bill, and the court held that vessels libeled might be rearrested on an amended libel setting forth such items of services.

* * *

The facts in the case of KOREA MARU, reported in 254 *Federal Reporter* 397, showed that two passengers on a steamship were compelled by reason of the stifling condition of their quarters, the heat and impure air, to go upon the lower deck where they were hit by a large wave and injured. A number of interesting points of law were raised and the court, in affirming a decision in favor of the passengers, held that a ship is liable for the treatment of a passenger by its physician and surgeon, who was incompetent and unskillful, only when it failed to exercise reasonable care in his employment; that although the ship does not insure that the passenger will be carried safely, still it is bound to exercise as high a degree of care, skill, and diligence in receiving a passenger, conveying him to his destination, and setting him down safely, as the means of conveyance employed and the circumstances of the case will permit; that the passengers in going upon the deck for air and exercise, as was customary, did not assume the risk, unless the danger was apparent and obvious to them, exercising reasonable care for their own safety, or unless warned by the officers of the danger; that failure of the ship's physician and surgeon to treat one of the two injured passengers, although requested to do so, and treatment of the other for a contused wound when there was a compound fracture of a bone of the leg, was negligence, for which the ship was liable.

* * *

After declaring that one occupying the position of a wharfinger is bound to ordinary care and diligence, and no more, the court in the case of Morey v. City of New Rochelle, 254 *Federal Reporter* 425, held as follows: "The mere fact that a wharf is so built, or that the berths alongside it are so obstructed, that special care is necessary on the part of any vessel using the wharf, is not *per se* evidence of that lack of care and diligence which is negligence. The existence of danger only increases the quantum of the warfinger's duty, and he must inform those in charge of vessels patronizing his wharf of just what they must expect to encounter. A vessel is justified in assuming that the wharfinger has better information than any one else in regard to the condition of his own premises."

* * *

"Admiralty has jurisdiction (where there is a dispute between owners regarding the employment of a vessel)," said the court in the case of OLGA, 254 *Federal Reporter* 439, to require the majority owners to give a bond for the safe return of the vessel. The admiralty court has frequently protected the interests of a minority owner." It was further said that on principle it would seem that if an admiralty court has power to issue an injunction prohibiting majority owners from taking a vessel on a voyage contrary to the wish of a minority owner, unless they give a bond for its safe return, it has equal power to issue an injunction prohibiting owners from exercising other acts of ownership such as transferring title, unless a bond be given that, upon the transfer, the minority owner who objects to such transfer will receive his share of the proceeds.

* * *

The sum of $15,000 was awarded the steamer ST. CHARLES in the case reported in 254 *Federal Reporter* 509 as salvage under evidence showing that a certain steamship, with a cargo of iron and valued at $2,000,000, stranded near the coast of Spain, which was in the submarine zone, in September, 1917, that the ST. CHARLES, part of a convoy, and valued at $500,000, contrary to orders, came to the steamship's assistance and within three hours released her from danger, and that the ST. CHARLES rejoined her convoy in time to reach the port of destination without loss of time on the part of the convoy.

* * *

In deciding whether a tug having a vessel in tow was liable for injuries to the tow, the court, in the case of the TEASER, 246 *Federal Reporter* 219, said: "In navigating a tow, the master of the barge in tow has no voice. * * * The tug is the dominant mind and will. * * * So far as the proper navigation of the tow is concerned, the law is abundantly settled that the tug leads and commands while the tow is bound to follow her guidance and conform to her directions. * * * Movement of tug and tow cannot be made under the joint command of the two masters. In such an adventure there can be no divided responsibility. Hence the law imposes upon the tug, not upon the tow, the duty to use a hawser of a length which the law deems essential to safe navigation. Being in sole charge of the navigation of the tow and being solely charged with the observance of laws of navigation, public policy demands that the tug shall be liable to the tow for the consequences of her violation of those laws.

"In this case the hawser was on the deck of the tug and was paid out by her. The physical as well as the legal control of the hawser was with her. Anyone acquainted with watermen will appreciate how unlikely it would be for the master of a barge in tow to attempt to control or override the master of the tug in matters of navigation, or that any consideration whatever would be paid to his views. * * * As the master of the tow was without power to control or even influence the master of the tug, we find that the act of the master of the tug in lengthening the hawser, even though upon the request of the master of the tow, was the sole and in legal effect the independent act of the master of the tug, which being an act violative of laws of navigation, fastens liability upon the tug for its consequences."

* * *

The CLEMATIS, laden with wheat belonging to the commission for relief in Belgium, collided with the EL MONTE near one of the docks in the port of Galveston, Tex., the port of loading, resulting in the damaging of some of the wheat by salt water, necessitating unloading, drying, reconditioning and reloading. The manner of computing the damages recoverable was one question at issue in the case arising out of such collision, reported in 252 *Federal Reporter* 50, and the court held that an allowance to the owner of the difference between the market value of the wheat at Rotterdam, its destination, in sound condition, and the value of the same wheat at Rotterdam in its damaged condition was proper, it satisfactorily appearing that it would have been a great sacrifice to have sold the wheat on this side, that the difference between the value of the damaged wheat at Rotterdam and what it would have been worth there if it had not been damaged as a result of the collision was a sum less than the difference between value of that wheat at Galveston before the collision and its value there after it was dried and treated.

Digitized by Google

October Ore Shipments

Shipments of iron ore declined during October, the total movement being 6,201,833 tons, a decrease of 1,976,600 tons when compared with the September movement. Falling off in demand and delays at the docks are the direct causes of the curtailed movement. In comparing the figures with those of October, 1918, when the movement was 8,541,593 tons, a decrease of 2,339,710 tons is shown. Total shipments to Nov. 1 are 43,978,414 tons. Comparison with the figure for the corresponding period of last year, 56,870,871 tons, shows a decrease of 12,892,457 tons. The total estimated movement for 1919 is placed at 48,000,000 tons.

Detailed shipments by ports are:

Port	Oct., 1919	To Nov. 1, 1919
Escanaba	756,926	4,453,922
Marquette	280,222	1,881,786
Ashland	878,031	5,388,207
Superior	1,830,472	10,283,790
Duluth	1,886,951	15,945,625
Two Harbors	569,281	6,025,084
Total	6,201,883	43,978,414
1919 decrease	2,339,710	12,892,457

Soo Canal Report

During October 2249 vessels with an aggregate net registered tonnage of 6,695,423 passed through the Soo canal. These vessels carried 9,713,919 net tons of freight. Compared with the freight movement for September, when 10,202,917 tons were handled, the figures show a decrease of 488,998 tons. The movement in October is 4,189,368 tons less than that in October, 1918, when 13,363,287 tons were handled, and the lowest for a like period of any year since 1916 when 9,116,196 tons were reported. The total movement for the year up to Nov. 1 is 62,901,854 tons. When compared with the figures up to Nov. 1 of 1918, a loss of 13,262,204 tons is shown.

Wheat is coming forward more freely. The October movement, 22,252,196 bushels, shows an increase of 12,071,205 bushels when compared with the amount recorded for September. Flour shipments are also heavier. The October movement of 1,544,510 barrels, when compared with the September movement of 917,420 barrels, shows an increase of 627,420 barrels. The ore movement is dropping off. In October, 6,059,450 tons were moved against 7,948,562 tons in September, a decrease of 1,889,112 tons. Lumber, grain, pig iron, hard coal and oil shipments were heavier in October than in September while decreases are shown in copper, stone, manufactured iron and steel and salt. The passenger movement has dropped from 8176, the number carried in September, to 729 for October. The tonnage figures for the past six years follow:

	Net Tons
October, 1919	9,713,319
October, 1918	13,363,287
October, 1917	12,646,066
October, 1916	9,116,196
October, 1915	11,557,851
October, 1914	7,740,005

Of the total freight carried in October, 9,405,126 tons were handled by the United States canal while 308,793 tons passed through the Canadian canal.

The following tabulation gives the season's figures in detail for 1919 and 1918:

	To Nov. 1, 1919	To Nov. 1, 1918
EASTBOUND		
Lumber, M feet B. M.	217,678	263,725
Flour, barrels	6,255,204	6,579,894
Wheat, bushels	88,539,412	47,851,515
Grain, bushels	39,895,715	19,947,472
Copper, net tons	51,312	73,764
Iron ore, net tons	43,445,065	55,913,671
Pig iron, net tons	3,773	.....
Stone, net tons	51,862	11,732
Gen'l merch., net tons	60,577	56,587
Passengers, number	28,348	17,251
WESTBOUND		
Coal, soft, net tons	11,154,721	14,244,240
Coal, hard, net tons	1,877,711	1,665,731
Iron ore, net tons	126,436	136,036
Mfd. iron and steel, net tons	104,860	35,097
Salt, net tons	83,877	71,507
Oil, net tons	335,094	292,729
Stone, net tons	309,912	367,875
Gen'l merch., net tons	389,455	339,547
Passengers, number	28,553	17,662
SUMMARY		
Vessel passages, number	16,126	18,237
Registered tonnage, net	45,855,020	54,671,427
Freight		
Eastbound, net tons	48,218,998	59,011,296
Westbound, net tons	14,382,106	17,152,762
Total freight, net tons	62,901,854	76,164,058

Lake Erie Receipts

Out of a total of 6,201,883 tons shipped from upper lake ports in October, Lake Erie ports received 5,728,410 tons, as shown by figures compiled by THE MARINE REVIEW. The balance on dock Nov. 1 was 10,004,767 tons against 9,909,279 tons on Nov. 1, 1918. Detailed figures are:

Port	Gross tons
Buffalo and Port Colborne	804,177
Erie	263,606
Conneaut	901,661
Ashtabula	1,400,349
Fairport	183,970
Cleveland	1,034,174
Lorain	597,379
Huron	156,796
Toledo	323,911
Detroit	62,387
Total	5,728,410

The barge JAMES MOWATT, Capt. Gus Lockhart, owned by S. C. McLouth, Marine City, struck on piling at the mouth of Thunder bay, Nov. 11. Breaking of a tow post caused the barge to go adrift. The tug ISABELLE went to the assistance of the barge while the crew were taken off by the coast guard.

Rules for Locking

Since the opening of the fourth lock, St. Marys Falls canals, all downbound vessels for the new canal have been dispatched to the northwest pier, according to a recent announcement of Maj. E. M. Markham, United States engineer in charge of the canal. The rule of operation has required downbound craft to use the fourth lock and upbound the third lock, except in cases of congestion, in which event the third lock has been employed for downbound movement. This rule has given general satisfaction, except that the crossing over from the northwest pier to take the third lock creates confusion so that it is feared by the committee on navigation, Lake Carriers' association, that some of the masters may find it difficult to make this crossing safely when either lock is filling.

In view of this condition, it has been decided that for the remainder of this season the use of the third lock will be confined to upbound traffic somewhat more closely than has been the case during the past month, and that it will be utilized for down vessels only in the event that there are four or more boats waiting above the fourth lock, that is, during periods where congestion of downbound traffic is somewhat marked. Also, in view of the uncertainty of safe navigation across the canal, vessels will not be ordered from the northwest pier to the south side to pass the third lock at times when either the third or fourth lock is filling.

As an aid in carrying out the latter rule, signals will be established at the head of the two locks to be shown when either is filling. These signals will be visible from any point in the upper canal, night and day. Their exact character has not yet been determined, but will be announced shortly by bulletin in the canal office.

The arrangement outlined may result in some delay to individual vessels, but it is assumed that the need of minimizing the possibility of serious accident will be appreciated, and that individual delays will be accepted as advisable to promote safe navigation under all conditions.

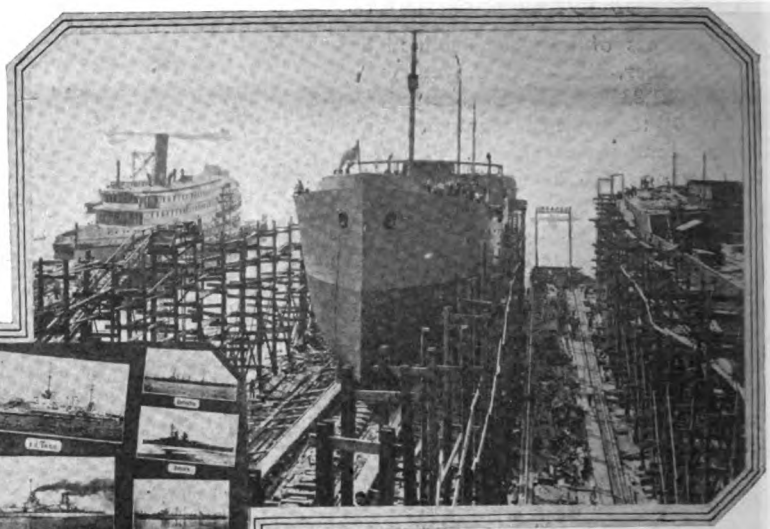
In this connection, it is desired to call attention to the general rule, long in force, that all approaching vessels put out mooring lines before passing the "stop" signs on the canal walls. A recent violation, which threatened serious consequences to the vessel as well as to canal operation, renders it advisable that all owners carefully instruct masters to follow the rules, recognizing that they are adopted in the best interests of all concerned.

Digitized by Google

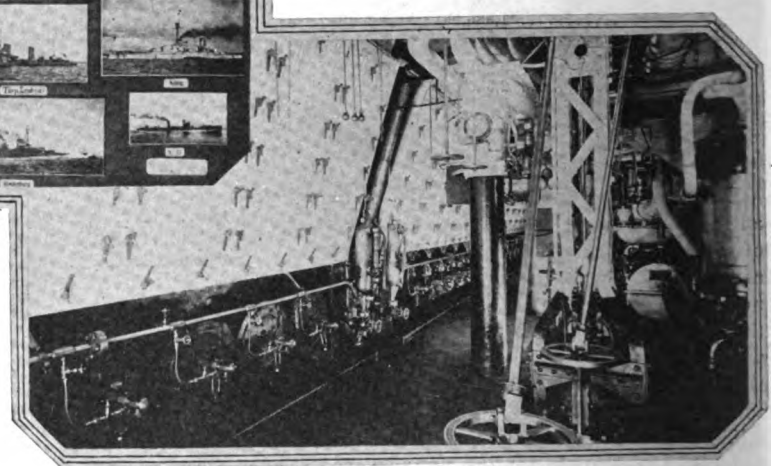
Photographs From Far and Near

© *by Press Illustrating Service*

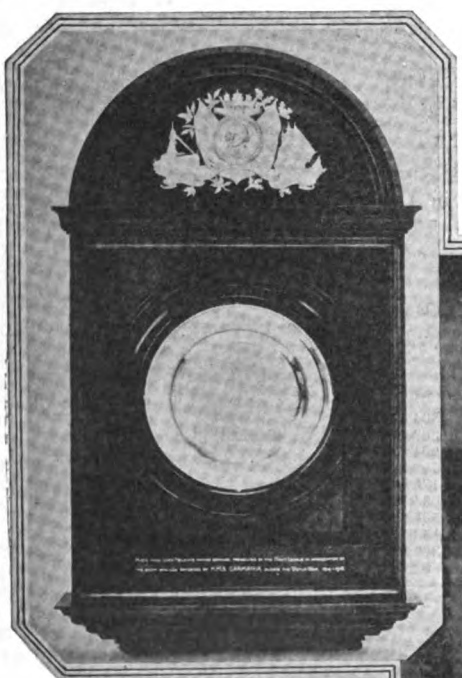
Memorial tablet erected in Germany to extoll the deed of Admiral Reuter in sinking the surrendered German fleet in Scapa Flow in violation of Germany's treaty.



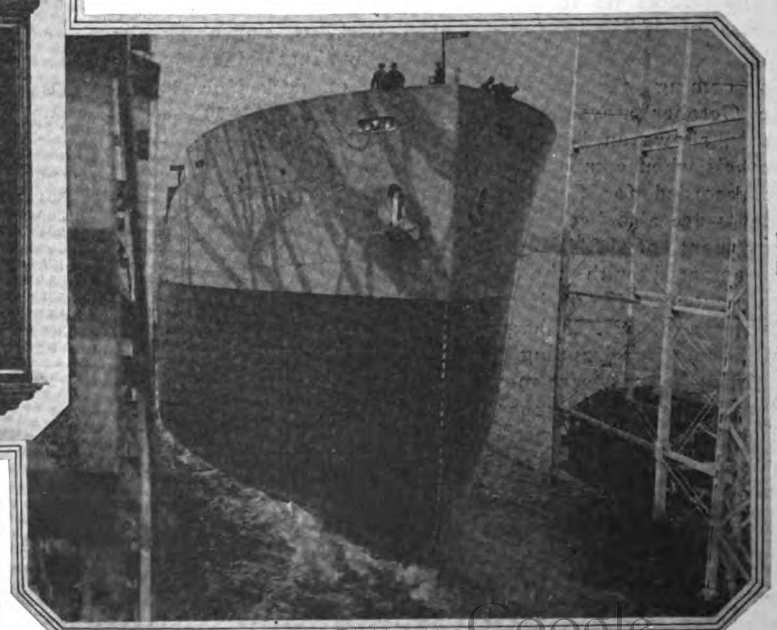
The Bethelridge going down the ways at the Baltimore Dry Docks & Ship Building Co.



"Immaculate cleanliness" distinguishes the boiler room of the United States oil-burning battleship New Mexico. Here are shown three of the nine boilers which send steam under pressure of 250 pounds to the turbo-generators which produce electricity for driving the ship.



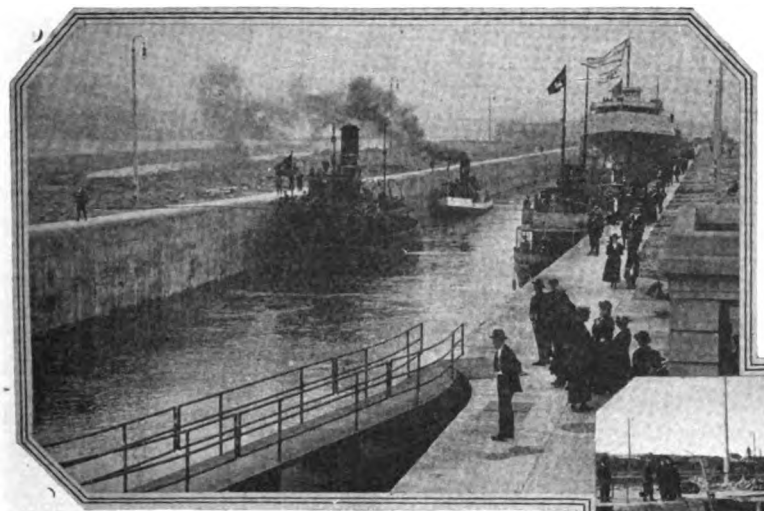
Silver plate from Lord Nelson's dinner service presented to the Cunarder Carmania on the fifth anniversary of the sinking of the German commerce raider Cap Trafalgar by the merchant ship.



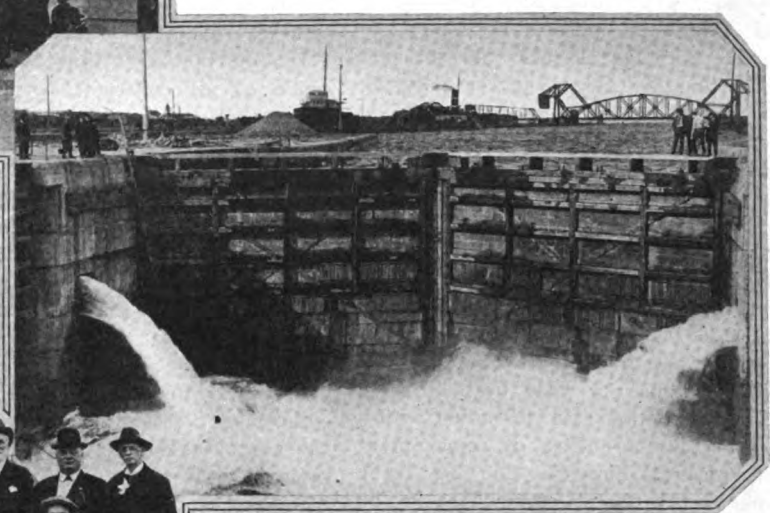
Scottsburg, 436-foot freighter, launched Oct. 7 by the New York Shipbuilding Corp.

Digitized by Google

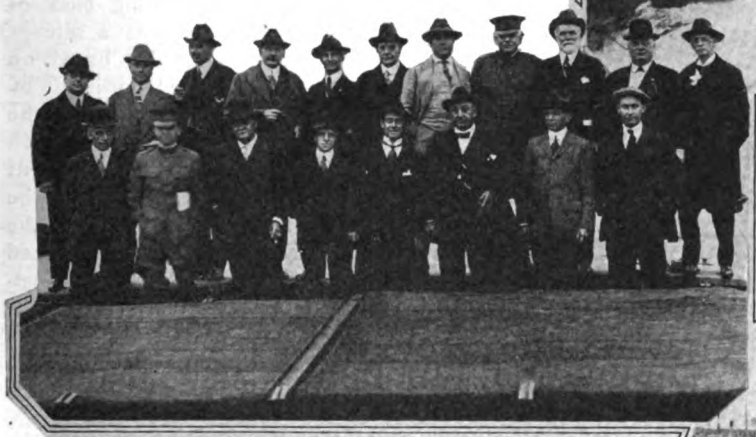
The Latest Marine News in Pictures



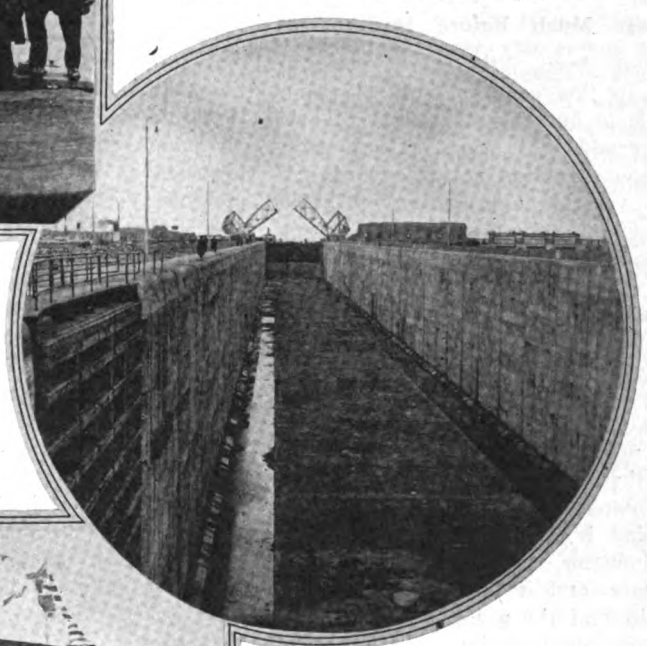
The bulk freighter, William Livingstone, had the honor of being the first large vessel through the Sabin lock, the new fourth lock at Sault Ste. Marie, which was opened Sept. 18.

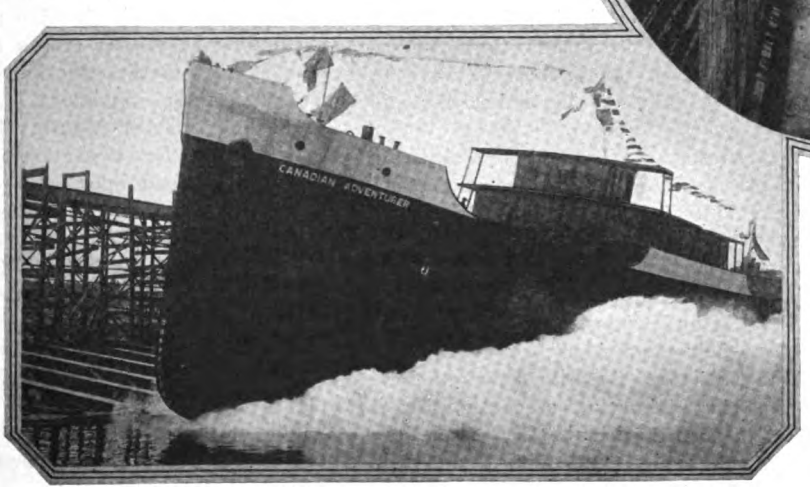


Water pouring into the Sabin lock for the first time, and, below, the prism of the lock before filling.



Officials of the Lake Carriers' association, including the president, William Livingston, and the secretary, George A. Marr, aboard the first vessel to pass through the Sabin lock. Construction of the lock began in 1913 and it cost $3,000,000. It is used for all downbound traffic.





Canadian Adventurer, launched Sept. 8 by the Port Arthur Shipbuilding Co., Ltd., should have a noble career, having been christened by the Prince of Wales.

Digitized by Google

How to Determine Shipyard Costs

A Study of the Factors Entering into Ship Construction Costs With Outline of Method for Adapting Findings to Different Yards

BY CREIGHTON CHURCHILL

A MATTER of intense interest to the shipbuilding industry of the country is its ability to compete with foreign yards during and after the period necessary to provide tonnage to make up for war losses and the normal increase during the period of the war. Published records show 21,800,000 deadweight tons of shipping lost since the beginning of the war, during which time 15,700,000 tons were constructed, making a net loss of 6,100,000 deadweight tons. The rate of construction for five years prior to the war was 2,300,000 tons per year, which, it is anticipated, will become about 5,000,000 tons per year until 1924 or 1925, when the rate of construction will become a matter of replacement and natural increase due to trade expansion, probably somewhere in the neighborhood of 3,000,000 tons a year. Naturally, a large percentage of this will be steel construction.

Sees Much Future Business

As of April, 1919, there were 67 yards in this country with 425 ways capable of building steel ships of over 3000 deadweight tons. There were under construction at these yards 637 steel vessels aggregating 4,225,000 deadweight tons, and 591 vessels, aggregating 4,200,000 deadweight tons, yet to be constructed. In this country alone, therefore, provision has been made to add some 8,425,000 tons to the world's shipping with a total yearly output of approximately 3,000,000 to 4,000,000 tons, depending on the type of ship. It is apparent, therefore, that it will take about two years to complete the present program, provided it was spread over the entire industry. This, however, is not the case, and it is estimated that at the close of the present year from 30 to 50 per cent of the country's capacity will be available for contracts for private account. In other words, a capacity of from 1,000,000 to 2,000,000 tons a year will be released, and it is tonnage to this amount that must be built to meet immediate demands and at the present prices of material and labor. If this business can be secured, it is the writer's firm belief that the shipbuilders of this country will find the means to develop the industry along modern lines such that its future will be assured.

During the war, time was the essence of all contracts, with expense a less than secondary consideration. With conditions reversed and a reasonable time to adjust themselves on a strictly economical basis, shipbuilders will continue in business only so long as they pay strict attention to factors under their control. It was hardly to be expected that any great degree of man efficiency would be shown as a result of construction during war time. In some few cases —those of old-established yards, where the percentage of new men was comparatively low—the records of performance were little short of wonderful. In a large majority of cases, however, both the men and the management were decidedly lacking in skill and experience, which is easily accounted for if one stops to consider that in a remarkably short space of time shipyard labor increased from 50,000 to over 300,000 men. To supply competent and skilled supervision for such an increase was next to impossible, yet, in a way, it was done and ships were launched and sailed the seas to the everlasting credit of the country. "Ships and more ships" was the slogan then, and the ships came. "Low costs and a living wage" might well be the slogan of the future, for it can easily be demonstrated that with a reasonable rate of production on the part of labor there is no valid reason why this country should not maintain its high standard of living, which means high wages, yet secure all the business wanted to keep the industry in a healthy and flourishing condition.

A cursory analysis of the situation indicates that the factors under direct control of the shipbuilders are organization, management, methods, and, to a greater or less extent, men. The prevailing market controls both material and wages, the latter through labor being considered a commodity. The spirit of the times would indicate that labor as a commodity is not in accord with the future relations between capital and labor, and it is, therefore, extremely doubtful if the market will exercise its former control on wages. For the purposes of this paper this has an important bearing in that the element of wages will be treated as one of the factors not under control by the shipbuilder. The direct effect of such treatment will be to concentrate attention on factors that, beyond any question, are under control.

It is a foregone conclusion, other things being equal, that the success of an industry is largely a matter of organization and management. In modern thought the former is considered a science and the latter an art. Science above all things demands exactness, and the reasoning back of referring to organization as a science is that it is, or should be, based on certain facts determined entirely by the nature of an industry and the various operating functions by which it is controlled. That management may justly be termed an art must be admitted when one considers the varying degrees of success attained by different men in the same position and with the same tools (the organization). Methods are simply a means by which the artist (the management) manipulates the tools (the organization) at his disposal.

Methods Must Be Simplified

In many cases, perhaps a majority, methods are more or less a growth fostered by the necessity of the moment, a sort of patchwork with additions here and there to fill in a vacancy. For example, it may happen that a method of storekeeping is installed that in itself is perfectly satisfactory as far as stores are concerned, but involves other departments to their detriment. Methods should be considered from the point of view of the organization as a whole. If looked upon as the means of co-ordinating the activities of the various units of the organization, the problem will be much simplified. As a general rule, methods should be the result of a careful analysis, otherwise a useless amount of paper work may creep in. They are only useful insofar as they accomplish a well defined purpose and in the simplest possible way. The writer has in

A paper presented at the twenty-seventh annual meeting of the Society of Naval Architects and Marine Engineers, held in New York, Nov. 13 and 14.

Digitized by Google

mind, as an example of a method installed without having been given proper consideration, a case of keeping time to tenths of an hour without any provision having been made to provide the next job for the man. From the cost-accounting point of view this was fine, but it did not mean more accurate costs for the reason that the actual costs depended entirely on how soon the foreman could find the next job for a man to work on. In other words, in this particular case, keeping time to tenths of an hour was a perfectly useless refinement, did not tell the true story and, worst of all, was in no sense a fair measure of man efficiency. Incidentally, the above method of keeping time was installed at the suggestion of the accounting department and is a good illustration of the tail wagging the dog. Had the matter been referred to a properly qualified management expert from the outside, no such half-way measures could have been the result of even a superficial analysis of contributing factors. As a general rule it has been found to be a safe policy to secure the services of such experts, when circumstances warrant, on the theory that, having a specific problem to solve and not being directly concerned with the daily activities of a going business, they have everything in their favor.

Labor a Paramount Item

Assuming that the organization, management and methods fulfill requirements, the only remaining factor under control is the men. On this factor hinges final costs after defects in the other factors under control have been remedied. It may be of interest to know that the results of analytical studies of operations in over 50 per cent of the steel yards engaged on construction for the Emergency Fleet corporation during the war indicate that less than 20 per cent of the faults developed were chargeable to the men. This is simply another way of saying that other factors under control were responsible for some 80 per cent. Accepting this statement as correct, it will be shown that the combined result of reducing the faults of both men and management is a material reduction in construction costs. In fact, the practicability of so doing is what confirms the writer in his belief that the shipbuilding industry will have itself to blame if it cannot stand on its own feet in the face of foreign competition.

In investigating the costs of ships of different types and cargo carrying capacity, an intimate relation developed between fabricating capacity, number of ways, construction program and man efficiency, the last expressed in deadweight tons of output per man per year based on the entire force engaged on ship construction, exclusive of office force and men engaged on plant construction. A 7500 deadweight cargo vessel was used in the calculations, with material costs as follows:

Hull, $212,952 (plates at 3¼c; shapes at 3c; bars at 2.9c.)

Machinery, $266,515 (2899 horsepower reciprocating engines; three 13 x 12-foot Scotch boilers).

Equipment, $104,371 (military requirements, $30,000).

A certain fixed overhead per ship per day was used and due allowance made for the extra cost of military requirements to bring the final costs down to a strictly commercial basis for a ship of this type and specifications.

The labor cost was calculated on the basis of man efficiency, using $5.40 as the average daily wage of all men engaged on ship construction. To arrive at the number of men per way the following formula was used:

$$\text{Men per way} = \frac{300 \times a}{b \times c}$$

In this formula, a = fabricating capacity per 8-hour day, b = tons steel erected per man per year, c = number of ways, and 300 = number of working days per year.

Launching was assumed when 90 per cent of the steel was erected and riveted. A balance between fabricating, erecting and riveting was taken for granted.

Fig. 1 shows deadweight-ton cost curves for a 5-way yard, plotted for different building programs and man efficiencies with fabricating capacity to meet program requirements. The minimum cost line shows the most economical building program for certain given conditions.

Fig. 2 is a companion curve to those in Fig. 1, being plotted from the same data, and shows the fabricating capacity corresponding to most economical building program.

Fig. 3 shows deadweight-ton cost curves plotted for different numbers of ways and man efficiencies with a fixed fabricating capacity of 150 tons per 8-hour day. The standard ways line shows the most economical number of ways for different man efficiencies.

Fig. 4 shows cost curves based on the same data as those in Fig. 3, but referred to deadweight-ton cost and man efficiency as co-ordinates.

A careful study of Figs. 1 and 3 develops some interesting results which may be expressed as laws and enumerated as follows:

(1.) For a given man efficiency there are a certain definite number of ways and a certain building program that will result in minimum costs.

(2.) As man efficiency increases costs decrease according to a diminishing ratio and not in direct proportion to increase of efficiency.

(3.) The lower the man efficiency the greater the number of ways and the longer the building program to secure most economical construction.

Must Work to Standards

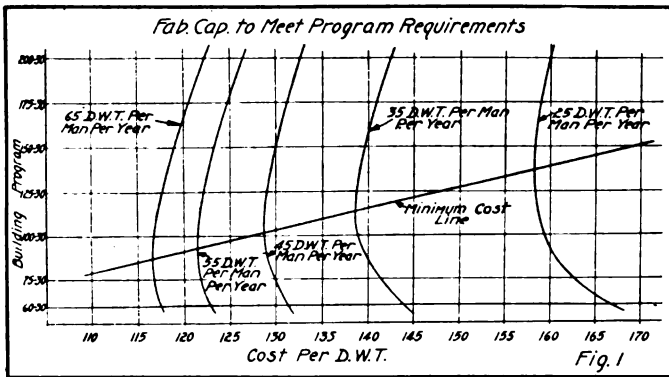
The intimate connection between man efficiency and building program show, beyond any question, the advisability of working to standards and setting such standards within reach of the working force. For example, if a contract were secured for delivery of a 7500 deadweight-ton cargo vessel in 155 days from keel laying (125 days keel to launching and 30 days launching to delivery), there is a possible variation in cost of about $117 and $158 per deadweight ton, depending on whether the yard can show a man efficiency of 65 deadweight tons or 25 deadweight tons per man per year with a fabricating capacity of 90 tons per 8-hour day. Obviously this difference is entirely a matter of labor cost and shows the necessity of paying all possible attention to man efficiency and making every effort to bring it up to a standard. It is suggested that standards be set in accordance with the following table which represents actual performance on cargo ships in going yards for an equivalent period of 120 months:

D. W. T. Tonnage	*Standard per man year*	*Values of b*
3,500	30 D. W. T.	10
5,000	36 D. W. T.	12
7,500	45 D. W. T.	16
10,000	53.5 D. W. T.	20
12,000	61 D. W. T.	23

The values of b corresponding to the different man standards for ships of different tonnage is included in the above table because it is the basis for figuring the number of men per way to attain the given standard. (The values of b listed were derived from actual performance in 23 yards. Of these yards, 37 per cent manufactured engines and boilers, 32 per cent either engines or boilers and the balance, 32 per cent, neither engines nor boilers. This is mentioned that proper allowance may be made in the use of the formula for individual yards.)

Figs. 5 and 6 show the man standards and values of b in the form of curves

Digitized by Google


Fab. Cap. to Meet Program Requirements
65 D.W.T. Per Man Per Year
35 D.W.T. Per Man Per Year
45 D.W.T. Per Man Per Year
25 D.W.T. Per Man Per Year
Minimum Cost Line
Building Program
Cost Per D.W.T.
Fig. 1

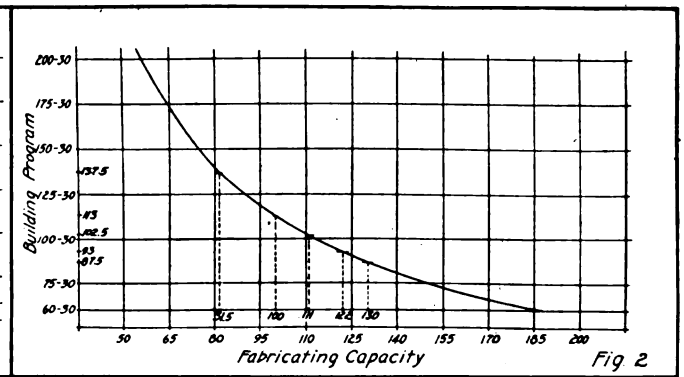
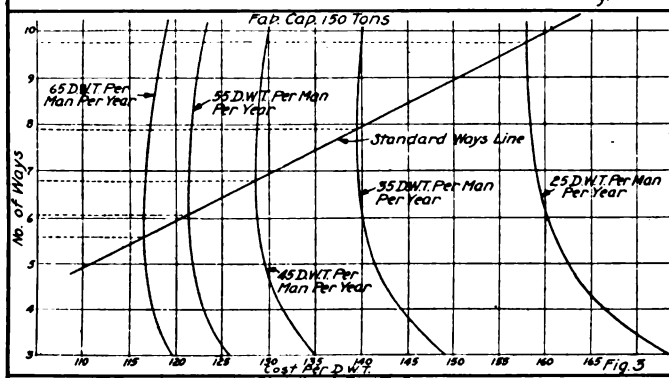


Fig. 2


Fab. Cap. 150 Tons
65 D.W.T. Per Man Per Year
35 D.W.T. Per Man Per Year
Standard Ways Line
35 D.W.T. Per Man Per Year
25 D.W.T. Per Man Per Year
45 D.W.T. Per Man Per Year
No. of Ways
Cost Per D.W.T.
Fig. 3

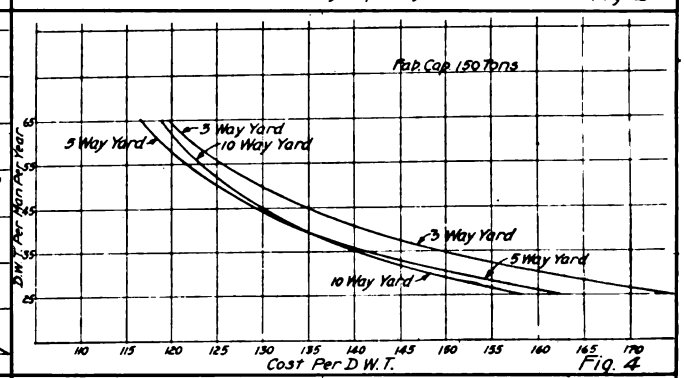


Fig. 4

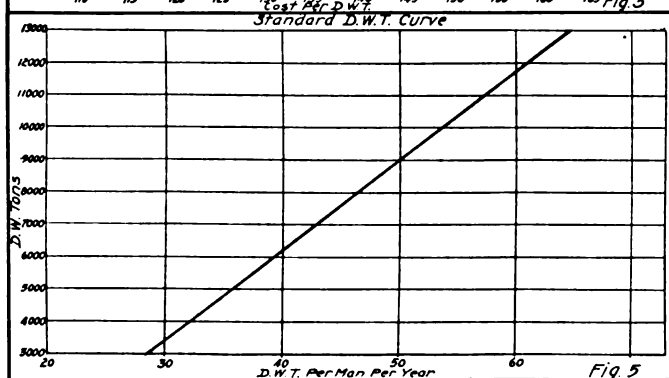


Fig. 5

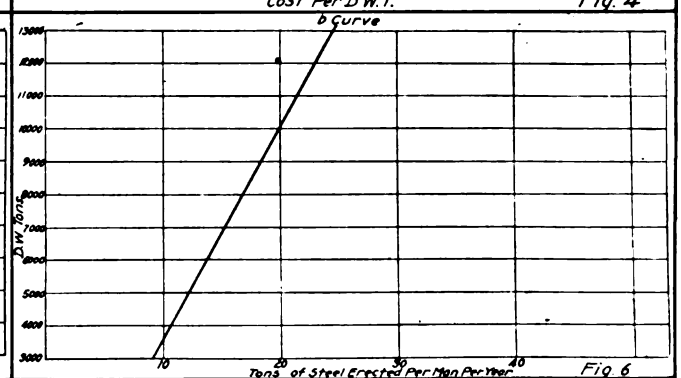


Fig. 6

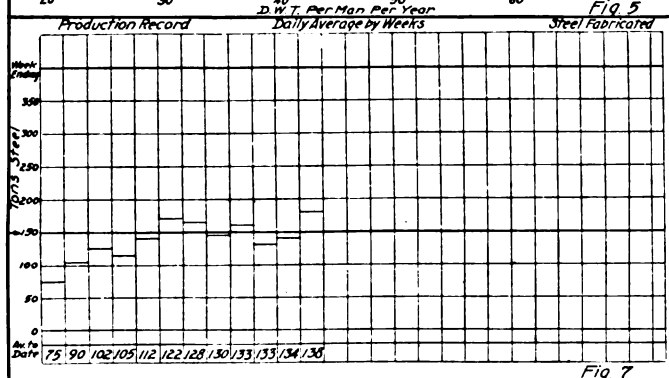
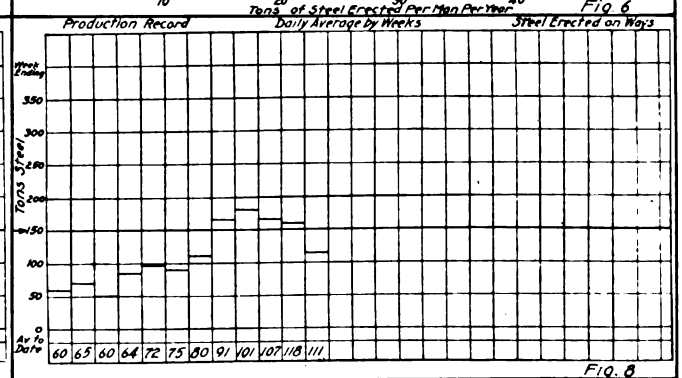
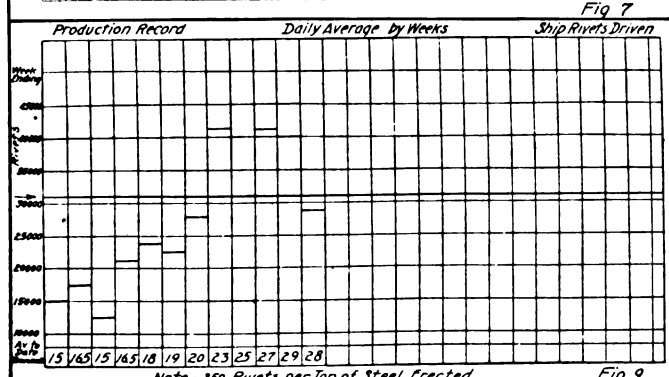
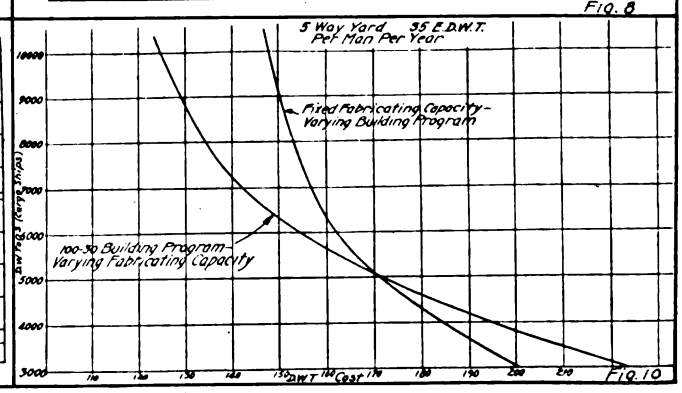


Fig. 7


Production Record
Daily Average by Weeks
Steel Erected on Ways
Week Ending
Tons Steel
Av. to Date
60 65 60 64 72 75 80 91 101 107 118 111
Fig. 8



Note - 250 Rivets per Ton of Steel Erected
Fig. 9


5 Way Yard 35 D.W.T. Per Man Per Year
Fitted Fabricating Capacity - Varying Building Program
100-30 Building Program - Varying Fabricating Capacity
D.W. Tons (Cargo Ships)
D.W.T.
Cost
Fig. 10

COST CURVES AS APPLIED TO SHIPYARD PRACTICE TO DETERMINE EFFICIENCY AND ECONOMY OF OPERATION

Digitized by Google

for cargo ships from 3000 to 13,000 deadweight tons based on 45 deadweight tons per man per year, for a 7500 deadweight-ton cargo vessel.

The main value of standards of any kind is the use to which they are put in practice. It is a grave mistake to utilize them only for executives that they may be kept conversant with performance. As a matter of fact much better results would be obtained if they were used for the information of the men doing the work. The common-sense way of using them is to present performance referred to standards to both the men and executives. In practice, performance with reference to standards is best presented to executives on a cost basis and to the men on a productive basis.

Ship construction depends primarily on a balance being maintained between fabricating, erecting and riveting, with outfitting and machinery installation depending on the progress of these three elements. That the standards set may be used to best advantage, Figs. 7, 8 and 9 are suggested as a form for presenting performance to the men. In the writer's opinion little or nothing is accomplished by presenting mere figures, from day to day, of the previous day's performance. Graphical records are much simpler to grasp at a glance and tell the story as a picture. Owing to the natural varying rate of ship construction, from day to day, the system of averages is used.

Shows Daily Performance

Figs. 7, 8 and 9 are based on building 7500 deadweight-ton cargo vessels in a 5-way yard with 150 tons fabricating capacity on a predetermined 75-30 building program. (Reference to Figs. 1 and 3 will show that this will be the most economical program only if the man efficiency is 65 deadweight ton per man per year or over.) Average daily performance by weeks is shown graphically, while figures are used to show this average to date. As drawn up, these graphs are intended for use by the general superintendent and the general foremen responsible for the different activities. For the information of the men the same general idea can be followed out with such changes as may seem desirable. It is suggested that, for this purpose, daily performance be used in connection with blackboards at each way and in the fabricating shops.

In considering these records, it will be noticed that the steel fabricated at the end of 12 weeks is 12 tons short of the required average output, that steel erected is 39 tons short and ship rivets 3000 short. Investigation or study of the data recorded shows at once that the steel erection is not keeping pace with the fabricating, while the riveting is being held back on account of erecting. This information in the hands of the general superintendent tells him, beyond any question, where to concentrate his attention to correct troubles or remedy faults not under control perhaps by the erecting foremen. Naturally, this could be done before 12 weeks had elapsed; in fact, his attention would have been called to existing conditions after the second or third week, and the results at the end of the twelfth week would show the extent to which he had been able to correct the trouble. In actual practice, of course, it is highly probable that the erecting and riveting records were below the standard set for well known reasons, but the fact remains that the yard has fallen down on the program because the erectors have been unable to keep up with the fabrication, also that the daily average output of the fabricating shops was not up to standard.

As a final example of the necessity of giving consideration to all the elements involved in shipbuilding, the curves shown in Fig. 10 were developed as indicative of what happens in actual practice. A 5-way yard is taken with a man efficiency of 35 equivalent deadweight ton per man per year. The problem is treated from two points of view, namely:

(1.) Constructing cargo vessels of different deadweight tonnage on a fixed 100-30 building program.

(2.) Constructing cargo vessels of different tonnages at a fixed fabricating capacity.

It is evident that a fixed building program involves different fabricating capacities and number of men per way for ships of different tonnage, while, with a fixed fabricating capacity, the men per way remain the same but the building program varies. That a proper comparison between these two conditions might be made, it was assumed that the yard was organized and equipped to build 5000 deadweight-ton ships on a 100-30 building program.

The conclusions to be drawn from a study of these curves show, beyond any question of doubt, that construction costs are dependent to a very large extent on tonnage, and, consequently, that each individual yard should confine itself to vessels that come within its field. Just what the field of any yard might be is determined from the most economical building program at a given man efficiency for ships of different tonnage. For a 7500 deadweight-ton cargo ship (see Fig. 1) the most economical building program is 113-30 at a man efficiency of 35 deadweight tons. Corresponding to this program (see Fig. 2), the fabricating capacity should be 100 tons. The number of ways corresponding to the above would be five, consequently a 5-way yard with 100 tons fabricating capacity would be in a better position to build a 7500 deadweight-ton cargo vessel than a yard differently equipped. Conversely, by the same method, the field of a yard can be determined, always keeping in mind the man efficiency. While a standard man efficiency of 45 equivalent deadweight tons has been offered as a result of actual performance it is suggested that, in yards that do not come up to this standard, a tentative one of 35 equivalent deadweight tons be set up to work to. Unless this is done, it is not possible to figure definitely on results to be accomplished nor keep in close touch with day to day performance. The term "equivalent deadweight ton" means performance referred to a 7500 deadweight-ton cargo vessel as a standard for comparison.

Veteran Builder Dies

John Watson, a well known shipbuilding engineer of New York, died recently at his home in Brooklyn, from cerebral hemorrhage. He was born in New York in 1855 and in 1872 he began his shipbuilding career as an apprentice in the old De Lamater Iron Works, New York. Later he was employed by W. A. Fletcher & Co., as a machinist. He left this concern after a four year's stay to go to the John Robins Co., Brooklyn, now the Todd Shipbuilding Corp. Four years ago he became one of the organizers of the Standard Shipbuilding Corp., New York, and at the time of his death, he was the corporation's general manager.

A. Y. Laing, of Laing & McKay, ship brokers, steamship agents and operators of shipping board vessels, New York, died recently. Formerly he was traffic manager of the France & Canada Steamship Corp.

The Mississippi Shipping Co. announces that the new 5000-ton steel steamer MOSHICO, recently completed for the shipping board at Mobile, Ala., will be delivered at New Orleans soon, and will be put into service immediately.

Digitized by Google

Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

JOHN H. ROSSETER, who has been director of operations of the United States shipping board since September, 1918, resigned on Oct. 31. Mr. Rosseter was well fitted for the position he held having been engaged in the shipping business for the past 37 years with the Pacific Mail Steamship Co., and W. R. Grace & Co., serving as vice president of both companies. Mr. Rosseter had tremendous responsibilities, as he had to build up an organization, plan trade routes, locate bunkering stations, make ship and fuel allocations, fix rates and direct vessel movements. He is succeeded by JOHN E. CUSHING. Mr. Cushing was born in California in 1887 and was educated at the Leland-Stanford university. After graduating, he entered the shipping business being first connected with the California-Atlantic Steamship Co., next with the steamship department of W. R. Grace & Co., and later with Williams, Dimond & Co., San Francisco. He was also the Pacific coast representative of the American-Hawaiian Steamship Co. In 1916, Mr. Cushing went to New York to take charge of the New York office of Williams, Dimond & Co. In the fall of 1917, he joined the quartermaster's department of the army and was commissioned captain at the port of embarkation, Hoboken, N. J. Under the shipping control committee, he was freight traffic manager for the movement of army supplies from New York. After his discharge from the army in the spring of 1919, he succeeded A. E. Clegg as assistant director of operations at New York. From that post, Mr. Rosseter brought him to Washington where he served as acting director of operations during Mr. Rosseter's recent visit to the Pacific coast.

* * *

HOWARD E. HUDSON has been appointed manager of the Kerr Steamship Co.'s recently opened branch in the Drexel building, Philadelphia. Previously, Mr. Hudson was assistant to the president of the Ore Steamship Corp., the ore transportation branch of the Bethlehem Steel Corp. For 14 years, Mr. Hudson was associated with Peter Wright & Sons and J. A. McCarthy, Philadelphia. The Kerr company has also appointed WILMER M. WOOD general freight agent at its New York office. Formerly Mr. Wood was traffic manager for the United States Cast Iron Pipe & Foundry Co., Philadelphia.

* * *

H. L. MODE has been made manager of the New York office of the Chesapeake Iron Works, Baltimore, manufacturer of traveling cranes.

* * *

W. T. ROACH has been appointed manager of the International Mercantile

JOHN H. ROSSETER

Mr. Rosseter recently retired as director of operations of the United States shipping board at Washington. He is succeeded by John E. Cushing

Marine Co., Philadelphia. He was formerly assistant manager and succeeds P. F. Young who died recently. Mr. Roach is well known in shipping circles. He was born in Philadelphia in 1870 and was educated at the Friends' Central school. In 1891 he became associated with the Atlantic Transport Co. at Baltimore and Chicago, resigning this position in 1893 to return to Philadelphia. When the Atlantic Transport Co. opened its office in Philadelphia in 1894, Mr. Roach resumed his connection with the line serving continuously until it was taken over by the International Mercantile Marine Co.

* * *

JOHN PENNINGTON has become associated with Phelps Brothers & Co., steamship agents, New York. Formerly he was export agent for the New York Central railroad.

* * *

GEORGE W. FOWLER has been appointed traffic manager of the Globe line, owned and operated by the Gaston, Williams & Wigmore Steamship Corp., New York. Previously to his recent appointment, Mr. Fowler was in the South American department of the New York office of the assistant director of operations, United States shipping board.

* * *

C. P. DOE has been elected vice president of the Merchants Navigation Co., New York, which was organized for the purpose of managing and operating shipping board and other vessels. Mr. Doe formerly was connected with the United States shipping board in the New York office of the assistant director of the division of operations. He is succeeded in this position by H. T. MACNEICE.

* * *

FRANK A. FACKRELL, for the past 10 years in the employ of Wilcox, Peck & Hughes, in its underwriting department, is now connected with the Oceanic Underwriters' agency. Mr. Fackrell began his career as an underwriter over 20 years ago with the Thames & Mersey Marine Insurance Co.

* * *

PAUL C. GRENIER has been appointed manager of the new Philadelphia office of F. Marti & Co., Inc., exporters, New York.

* * *

J. J. GILRRIDE recently was appointed assistant traffic manager of the Independent Steamship Corp., New York. FRANK B. LORD has been appointed Washington representative of the corporation.

* * *

JOHN F. BARBER, who resigned in October as vice president of the United States shipping board in charge of the ship sales division has returned to the the employ of Harris, Forbes & Co. He recently announced that his attention will be devoted mainly to ship securities.

* * *

CAPT. E. P. ERCKENBRACK has been appointed manager of the motorship fleet of nine vessels recently purchased by J. E. Chilberg and associates.

Digitized by Google

Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

GEN. GEORGE W. GOETHALS has been elected president of the American Ship & Commerce Corp. He still retains the presidency of the engineering firm of George W. Goethals & Co., Inc. General Goethals was born in New York in 1858. He graduated from the United States Military academy in 1880, serving there later as assistant professor of civil and military engineering. He was made a captain in 1891, a major in 1900, lieutenant colonel in 1907 and colonel in 1909. He served as chief of engineers during the Spanish-American war and was chief engineer of the Panama canal, receiving his appointment Feb. 26, 1907. At the completion of the Panama canal he was made a major general by special act of congress. He retired to private life only to be called upon a few months later to assume the management of the Emergency Fleet corporation. He organized the preliminary work of the corporation, laying out its program and contracting for ships. Dissensions between General Goethals and Chairman Denman brought about the retirement of both and he went to the war department as quartermaster general which position he held during the war. He also was connected with New York harbor and New York-New Jersey canal improvements.

* * *

GEORGE S. HEWINS, who has been general manager in the construction of ships for the United States shipping board at the yard of L. H. Shattuck, Inc., Portsmouth, N. H., since the United States entered the war, has become general engineer in charge of construction for the New England Power Co.

* * *

M. E. FARR was re-elected president of the American Shipbuilding Co. at its recent annual meeting held at Jersey City, N. J. Other re-elected officers are: JAMES E. DAVIDSON, first vice president; A. G. POTTER, controller; JOHN S. GORMAN, treasurer and assistant secretary; ALFRED G. SMITH, operating manager, and H. A. KELLEY, general counsel. ORA J. FISH retired as vice president to go to California on account of his wife's health. R. L. Ireland resigned as a member of the executive committee and HENRY S. PICKANDS, of Pickands, Mather & Co., was named in his place. SAMUEL MATHER, J. H. WADE JR., and R. G. HUTCHINS JR., resigned during the year as directors and G. G. WADE, HENRY S. PICKANDS and HERBERT P. HOWELL were elected directors.

* * *

JOSEPH MERCADANTE has been elected president of the newly formed Green Star Steamship Corp. which will operate ships over established trade routes while

HERBERT C. SADLER
Mr. Sadler recently resigned from the shipping board as naval architect to resume his work at the University of Michigan

ROBERT T. MCGREGOR, formerly general manager of the Federal Shipbuilding Corp., will be vice president and general manager. Several well known men in shipping circles are included in the board of directors; ALVIN W. KRECH, president of the Equitable Trust Co.; WILLIAM C. LANE, vice president of the Guaranty Trust Co.; RAYMOND T. MARSHALL of Wilcox, Peck & Hughes, and D. ROGER ENGLER, of Harrington, Bingham & Engler.

* * *

MORTIMER S. HORTON has severed his connection with Hagedorn & Co. to go into business on his own account. He is now associated with Messrs. QUAIL and SIMONDS recently of the Quail Shipping agency, the new firm being known as Quail, Simonds and Horton, 27 South street, New York. The firm will specialize in marine insurance.

* * *

J. W. GREINER, marine superintendent of the Canada Steamship Lines, Ltd., Montreal, has resigned and this position with the company has been abolished, according to a recent announcement of H. W. COWAN, a director of the company.

* * *

C. W. CROSS has been appointed manager of western railroad sales for the Chicago Pneumatic Tool Co., Chicago. Mr. Cross' headquarters are in the Fisher building, Chicago.

* * *

R. S. HUTCHINSON has been appointed manager of the Detroit branch office of the Lidgerwood Mfg. Co., New York, manufacturer of hoists, steering gears, ships' winches, etc. Mr. Hutchinson formerly had charge of the company's Philadelphia office.

* * *

J. H. DEPPELER of the Metal & Thermit Corp., New York, has been elected a vice president of the American Welding society and P. F. WILLIS, president of the Henderson-Willis Welding & Cutting Co., has been elected a director of the society.

* * *

CRAWFORD HILLMAN, who until recently was assistant chief inspector of the United States shipping board, division of operations, for the Delaware district, has been appointed port engineer for the International Freighting Corp.

* * *

SAMUEL MACCLURKAN has been made Chicago representative of the Cosmopolitan Shipping Co. with offices at 112 West Adams street. Mr. MacClurkan will serve as middle west freight contracting agent for the company. Formerly he was connected with Wilson & Co., as eastern traffic manager.

* * *

CAPT. WILLIAM J. MCGETTRICK, who has been in charge of the United States shipping service bureau, Detroit, since it was established, resigned recently to go to New York as dock superintendent of a large contracting company. He was succeeded by CAPT. E. J. CADOTTE.

Digitized by Google

Practical Crane Installations

Engineers Favor the Smaller Types of Cranes for Docks as Two Can be Used Simultaneously at One Hatch for Emergency Lifts

ENGINEERS who have studied the problem of port terminals are of the opinion that the normal equipment should consist of cranes of comparatively small lifting capacity. Large cranes have been installed in some cases but they are for emergencies only. The Erie railroad installed four electric traveling gantry cranes on pier H, Weehawken, N. J. Three of these have a 10-ton capacity whereas the fourth has 20 tons capacity. During the war they proved of considerable value and assisted greatly in the transfer of war freight between the railroad and steamship lines. To handle a miscellaneous cargo, such as the normal steamship delivery at any port, however, the smaller crane is said to be more economical.

The case of two 2-ton cranes installed at Beaumont, Tex., has been cited as a good example of the economies that result from a small outlay of capital. The Beaumont cranes measure 32 feet from span center to the center of rails, have a 24-foot vertical clearance under portal, a 50-foot reach of boom beyond front rail, and a 50-foot hook lift above rails. The wheel base of these cranes measure 23 feet. Their hoisting speed is 200 feet per minute, the jib can make three revolutions per minute and the traversing speed is 300 feet per minute.

While the Beaumont cranes may be considered small, it must be remembered that when it is desirable to lift package freight weighing more than the normal capacity of one crane, two cranes are used simultaneously at the same hatch. The city of Providence, R. I., which recently asked for a proposal on eight cranes, based its inquiry on a type of crane similar to the cranes at Beaumont, the boom reach and span being practically the same.

An investigation of the crane equipment at European ports indicates that the capacity for cranes of ordinary freight-handling piers should be preferably two or three tons rather than five or 10 tons, the object being to get more cranes for the same investment. Most ships have at least four hatches and an installation of cranes to be thoroughly efficient should be accordingly in units of four or eight so that each hatch may be served with its own crane.

The Beaumont cranes recently unloaded a cargo of asphalt in barrels, handling this cargo at the rate of four and one-half barrels per minute over a sustained period of eight and one-half hours, each movement involving a lift of 40 feet and a swing of 50 feet. The cost of handling the cargo was slightly less than 5 cents a ton. These figures were obtained from the harbor master, O. S. Hunter.

A harbor devoid of larger crane equipment, however, would undoubtedly have to contend with a great handicap. In many steamship cargoes are heavy-lift packages and these require the services of a crane of unusual capacity. The infrequency of the need of such lifts, however, is considered to make it impractical to equip all piers with heavy-lift cranes. One of the solutions suggested is to have a floating crane of unusual capacity which can be brought up alongside the ship.

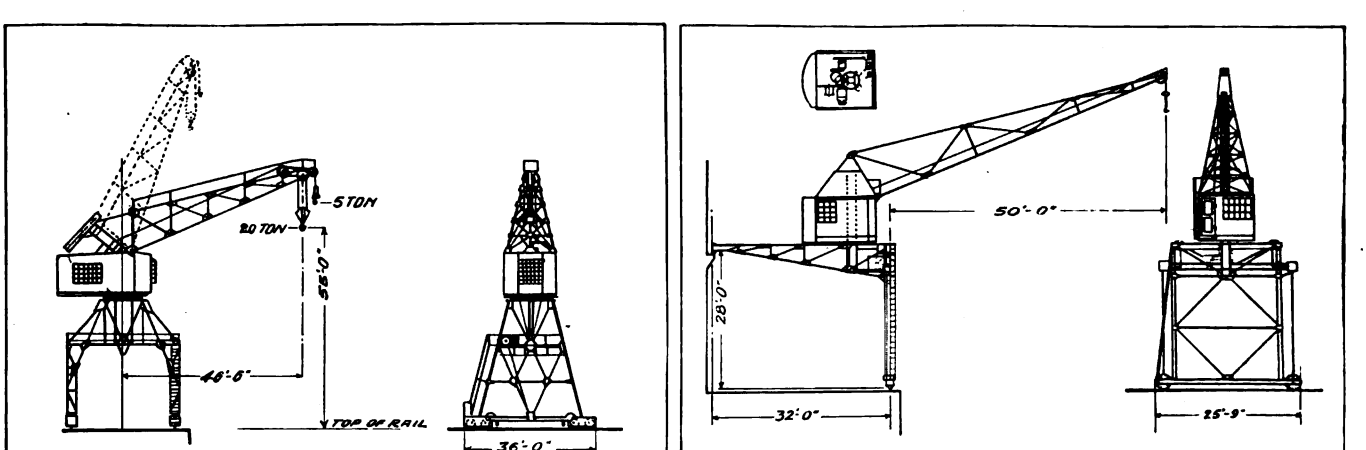
The equipment installed at the Erie terminal in the harbor of New York, however, is a most excellent arrangement from many points of view and it aided materially in loading heavy munitions, guns, etc., during the war and speeding up the turn-around of the vessels in port. They will prove most economical naturally, if a constant flow of heavy cargo is carried over this particular pier. Ships will naturally seek out such a pier in preference to one that is slower in loading and unloading and that will insure a constant source of revenue to the railroad.

Three of the Erie cranes have a normal capacity of lifting 10 tons at the outer end of the 50-foot boom, and they can easily handle 25 per cent overload. These cranes have a main hoist speed of 220 feet per minute; a swinging speed of three complete revolutions per minute, and they can travel up and down the pier at a rate of 150 feet per minute.

The fourth crane has a normal capacity of 20 tons on the main hoist and five tons on the auxiliary hoist. The speed of the former is 55 feet per minute, and of the latter 220 feet per minute. The swinging motion is such that two complete revolutions can be completed in one minute, and this crane travels along the pier at the rate of 100 feet per minute.

The wheel base of all cranes is 28 feet, and each crane spans two standard gage tracks, the gage of the gantry rails being 28 feet. In all cranes the hook lift distance is 90 feet, that is, from a position 30 feet below the rails to a point 60 feet above the rails.

In rebuilding the pier practically 1600 piles were cut off at mean low



TRAVELING PORTAL CRANE OF 20-TON CAPACITY AT ERIE RAILROAD PIER, WEEHAWKEN, N. J., IS SHOWN AT THE LEFT—AT THE RIGHT A 32-FOOT SPAN HALF ARCH GANTRY WHARF CRANE

Digitized by Google

water, 800,000 feet of timber in the old pier were removed and 1,111,000 feet of new timber were used in the reconstruction work. The plans also called for 421,000 pounds of heavy bolts and spikes.

These Erie cranes are capable of four distinct movements, all or any of which can be made simultaneously, as follows:

1.—The main-hoist motor can lift a piece of heavy package freight vertically.

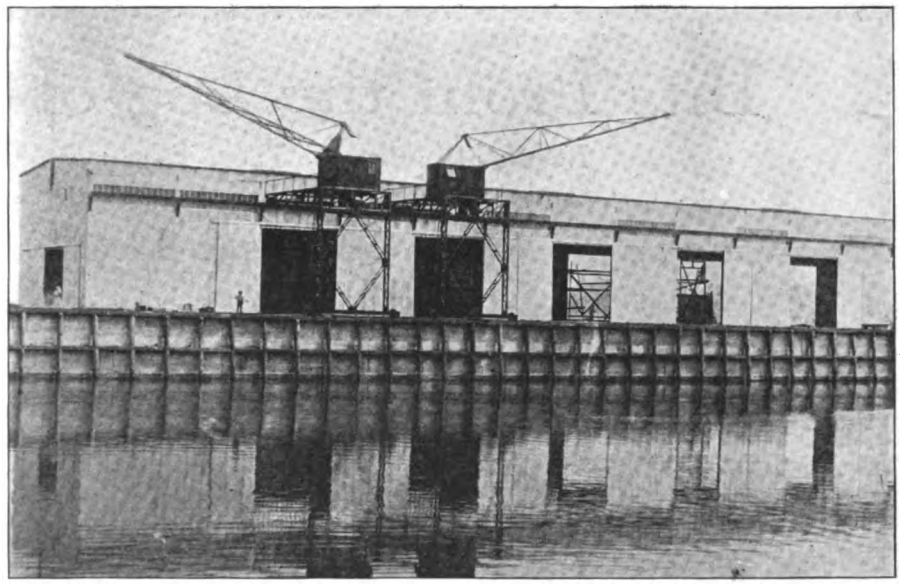
2.—The travel motor is capable of moving the crane longitudinally down the pier.

3.—The swivel motor can rotate the boom.

4.—The luffing motor is so arranged that the boom can be raised until it is almost vertical, thus clearing the masts or funnels of vessels and at the same time shortening the reach of the crane.

A crated automobile truck delivered to the pier on a flat car, on any one of the five tracks, can be reached by any one of the four cranes. It could be lifted off the car, carried any distance up the pier, swung around and placed in the hold or on the deck of a vessel lying alongside the pier, whether the hatchway opening is on the near or the far side of the center line of the ship.

The equipment also includes some electric magnets. These magnets are carried by the main hoist hook, suspended from the end of the boom. In the case of unloading a car of steel billets the magnet is lowered into the car. When it comes in contact with the billets, electric current is supplied through a suitable flexible cable with the result that when the magnet is lifted several tons of billets adhere to the face of it, and are securely held in that position until the current is shut off. These magnets have been productive of excellent results in cutting down loading costs.



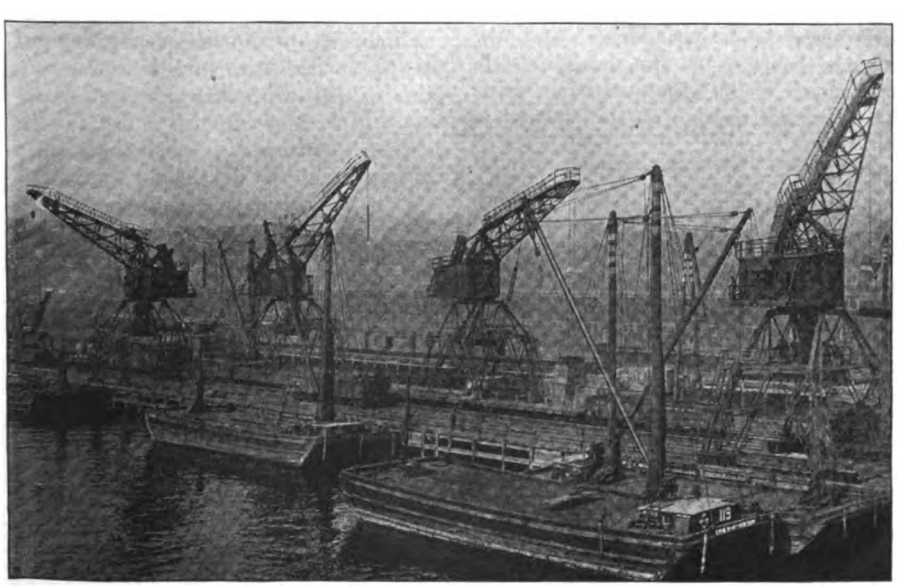
TWO-TON CRANES INSTALLED ON A WHARF—THESE ARE USED IN HANDLING PACKAGE FREIGHT

Offers Maritime Course

Lehigh university, South Bethlehem, Pa., is now offering a 4-year course in ship construction and marine transportation. The studies are arranged to train men to take part in the design and construction of vessels and, subsequently, having a knowledge of ships, to enter the larger field of marine transportation.

The course is a combination of engineering and economics preceded by the usual fundamental subjects included in engineering courses. An advantage of the course is the combination of engineering training with business administration.

The first and second years are devoted principally to physics, modern languages, chemistry, drawing and mathematics. Attention is given in the second year to the study of sciences and to some engineering work. Ship drawing and graphic statistics are also taken up in the second year. The third year is devoted to such subjects as strength of materials, hydraulics, metallurgy, heat engines, machine design and dynamos and motors. In the fourth year, the work is classified in three divisions: Naval architecture, marine engineering and economics, the last including foreign commerce and marine insurance. Graduates of this course receive the degree of naval engineer.



CRANES AT THE ERIE RAILROAD DOCKS, NEW YORK, FOR HANDLING PACKAGE FREIGHT

Late Marine Patents

Copies of any of the following patents can be obtained by sending 15 cents in stamps to Siggers & Siggers, 918 F street N. W., Washington, by mentioning THE MARINE REVIEW.

1318650—Marine signal, Adam Dutka, Sifton, Man.

1318712—Hull construction, Silas H. Woodard, Scarsdale, N. Y.

1318844—Boat propelling mechanism, Peter Carnegis, Washington.

1318571—Propeller, James M. Maher, Fremont, Nebr.

1319145—Detecting and locating ships, Reginald A. Fessenden, Brookline, Mass., assignor to Submarine Signal Co., Portland, Me.

1319182—Steering device for ships, Massey Sitney, Brooklyn, N. Y.

1319351—Ships' life boat davit, Thomas Henry Marten, Toronto, Ont.

1319352—Attachment for life boat davits, Thomas Henry Marten, Toronto, Ont.

1319353—Davit for ships' life boats, Thomas Henry Marten, Toronto, Ont.

1319356—Oar and oarlock, Peter Olsen, Sydney, N. S.

1319378—Ship floating means, Henry D. Deam, Benton Harbor, Mich.

1319424—Ship floating apparatus, William Schneider, Chicago, assignor, by direct and mesne assignments, to Marine Safety Appliance Corp.

Digitized by Google

Bits From the Log of Progress

Events of Interest to Those Engaged in Operating, Constructing and Outfitting Yards and Ships

AN ARRANGEMENT has been made between the commonwealth of Massachusetts and the Bethlehem Shipbuilding Corp., by which improvements are to made at Haywards creek which is part in Quincy and part in Braintree. A floating drydock of massive size to cost upward of $2,000,000, a new railroad link to connect the waterfront with the New York, New Haven & Hartford railroad and the reclamation of 20 acres of land for the state, will result. This land will be leased or sold for industrial purposes. It is estimated that the construction work will involve an expenditure of $5,000,000.

* * *

Direct steamship service between Boston and Rumania and various Black sea ports has been undertaken by C. H. Sprague & Son, Boston. The first steamer sailed in November. Boston has never had such a line and its establishment opens up an excellent market for Massachusetts exports. The first cargo shipped consisted of boots and shoes, electrical machinery, agricultural implements and other New England commodities.

* * *

The American bureau of shipping, after exhaustive investigations has decided to place concrete ships in the experimental class. Full class, as has been desired, is denied. This announcement recently was made by Capt. C. A. McAllister, secretary of the bureau's classification society. The decision was reached after consultation with prominent shipbuilders and naval architects of the United States. While opinion differed as to the smaller concrete ships, it was the concensus of opinion that vessels of 3500 tons were reliable, but those of larger register were not. The concrete ship has been given a similar class by Lloyds.

* * *

Details have been given out regarding the method used to take a photograph of the LAURENTIC, which lies on the bottom of the Atlantic off the Donegal coast. The camera was enclosed in a watertight iron tank, tested to withstand the pressure brought on it in 20 fathoms of water. The tank was fitted with a vessel's portlight glass. A diver took the apparatus down and electric bulbs were lowered from an admiralty salvage steamer to procure light to take the picture. An exposure of 1½ hours was required to make the photograph. The result was satisfactory.

* * *

The States Marine Co., Baltimore, recently inaugurated a steamship service between Baltimore, Gothenburg and other Scandinavian ports. At the present time, the company is maintaining a monthly service which will be made more frequent when commerce warrants placing on additional steamers. The company originally intended to maintain services between Baltimore, Genoa and other ports on the west coast of Italy. Shipping board vessels are used on the line. James Donald, who is president of the States Marine Co., is also president of the States Marine & Commercial Co. The States Marine Co. is the nineteenth marine enterprise to locate in Baltimore.

* * *

The steamer K. I. LUCKENBACH is at the south plant of the Baltimore Dry Docks & Shipbuilding Co., Baltimore, for reconditioning. She served as an army transport and will be converted into a cargo carrier. This is the fourth Luckenbach ship to be reconditioned at the Baltimore plant. Among other ships being refitted there are the troopships LANCASTER and LIBERATOR, which will become regular cargo carriers. They will operate out of Baltimore. Robert Ramsay is the managing director who will operate these two vessels for the shipping board. One of the ships will be assigned to the Liverpool route while the other will operate on the Rotterdam run.

* * *

According to Sir Frederick William Lewis, the new chairman of Furness Withy & Co., the efficiency of ships is fully one-third less than it was before the war. Some of the views expressed by Sir Frederick, according to the *Journal of Commerce*, are: The efficiency of tonnage owing to the delays of coaling, docking and loading is at least one-third less than it was prior to the war. The world has a surplus tonnage at the present time. In June there was 47,500,000 gross tons which is 2,500,000 in excess of the prewar total. After the next few months there will be a gradual decline in freight rates. America, having created a great merchant marine, cannot be expected to scrap either her shipbuilding yards or her ships. The port congestion of Great Britain is becoming a passing phase in ship operation.

* * *

Announcement was recently made by W. W. Tingle, a district agent for the shipping board, that several additional vessels would be allocated to Baltimore. Mr. Tingle also stated that the booking of cargoes for the Liverpool and Rotterdam lines had been completely filled and that there was an urgent demand for more ships for this service.

* * *

Great Britain welcomes the growth of the American merchant marine, according to Marshall Stevens, one of the founders of the Manchester ship canal. "Great Britain," he said, "feels that the world is large enough for both Great Britain and the United States to thrive as maritime nations as there is plenty to be done in common." Mr. Stevens suggested several lines, among them being a triangular route from Manchester to Brazil and thence to New York. He pointed out that this would eliminate the bringing of empty bottoms westward as the United States is not importing heavily from Europe at present while South American countries continue to be large buyers.

* * *

The fifteenth annual convention of the National Rivers and Harbors congress will be held on Dec. 9-11 at Washington. The convention is called for the purpose of discussing legislation needed for protecting and developing transportation and to secure co-operation between railways and waterways.

* * *

The Osaka Shosen Kaisha recently issued its business report for the half year ending June 30, 1919. The report shows that the company owns a total of 127 steamers with a tonnage of 325,072 gross, 25 steam launches and 5 gasoline boats, making a total of 157 vessels. It also has under charter 182 vessels with a gross tonnage of 383,389. The company made a net profit of 12,169,960 yen, equaling approximately $6,000,000.

Digitized by Google

Bits From the Log of Progress

Events of Interest to Those Engaged in Operating, Constructing and Outfitting Yards and Ships

REAR ADMIRAL FRANCIS TIFFANY BOWLES, former president of the Fore River Shipbuilding Co. and a high official in the shipping board during the war, was the first witness at the resumption of the trial of the government's suit to fix the price on the Cape Cod canal. He characterized Cape Cod as the most dangerous obstruction to navigation on the Atlantic coast and one of the most dangerous in the world. "In the last 25 years," he said, "there have been more than 1000 wrecks between Fisher's island and Provincetown, the majority of them in the vicinity of Monomy and along the cape to Provincetown. Shipping around the cape," Admiral Bowles stated, "has increased from 600 vessels annually in 1790 to 25,000 in 1918. The canal in its present condition could take care of 75 per cent of this number. With the present tolls, the annual income would be $1,200,000. The tolls can be doubled," he testified, "thus bringing the annual revenue to $2,400,000." Admiral Bowles estimated that schooners lose 25 to 35 days in clear weather annually waiting for suitable weather to round the cape while tugs lose 60 to 90 days annually and steamers 8 to 12 hours a trip on an average. During the year ended July 24 of this year, 6296 vessels with a total tonnage of 5,177,000 passed through the canal, an average of 17 per day.

* * *

Shipbuilders and vessel operators, as large employers of labor, realize that tuberculosis prevention is of vital importance at the present time. This year, more than one billion red cross Christmas seals have been printed for distribution by the National Tuberculosis association. In addition to the seals, health bonds ranging in denomination from $5 to $100 are to be sold instead of seals to large contributors who do not send out enough mail during December to make use of all the seals they would like to purchase. It will be necessary this year for the association to raise $6,500,000 to carry out its program made necessary by post-wartime needs.

* * *

The Radio Corp. of America has been formed and has taken over the radio rights of the General Electric Co., according to a recent announcement of Edward J. Nally, vice president and general manager of the Marconi Wireless Telegraph Co. of America.

* * *

An important feature of the seventh national foreign trade convention to be held at San Francisco, May 15 to 20, 1920, will be the world conference of American foreign traders, according to a recent announcement of the National Foreign Trade Council, New York. Three special steamers, chartered for the accommodation of delegates from abroad will be provided for the ports on the Pacific coast. Another steamer starting from New York will go to the Pacific coast via the Panama canal.

* * *

Cost of repairs to shipping board vessels in the New York division has been reduced to slightly more than $1,000,009 a month, while the number of vessels coming under the jurisdiction of that port represents approximately 70 per cent of the government fleet. The work is done on a competitive basis, except when the outlay is less than $5000. Specifications are sent to various shipyards who are invited to submit bids.

* * *

The United States shipping board will use from 2,039,000 to 2,558,000 tons of coal during the coming year. The coal will be distributed from 18 principal ports among which Boston will handle 75,000, New York 950,000, Philadelphia 350,000, Baltimore 300,000, New Orleans 30,000, San Francisco 85,000 and Seattle 35,000 tons maximum capacity.

* * *

According to Chester Lloyd Jones, Madrid, shipbuilding in Spain is progressing slowly in spite of the fact that Spain is desirous of equipping a substantial merchant marine. Shipping actually under construction in Spain at the present time has been variously reported, the average announced for the first half of 1919 being about 120,000 tons. The total at the end of 1918 was reported as 135,018 tons. At the present time, shipbuilding in Spain is carried on without governmental aid.

* * *

The initial attempt to salve a cargo of coal by the method of using a large centrifugal pump to throw it out of a submerged vessel into a barge recently was tried at Seattle. The barge ELECTRA had sunk with 16 feet of water over her deck at low tide. A 12-inch suction pipe was used to "pump out" the coal.

* * *

Shipping board plans for the Hog Island yard are now said to call for the completion of all vessels under construction by June, 1920. This will complete the program calling for 110 A-type cargo carriers. Of this number nearly 70 have been launched and over 50 have been delivered. The original program called for 70 B-type transport ships. Of this number, contracts for 58 have been cancelled, leaving 12 which the shipping board will complete. The king of Belgium sponsored the first of this type, the CANTIGNY.

* * *

The Electrolytic Oxy-Hydrogen Laboratories, Inc., has organized a sales and manufacturing company known as the Electrolabs Co., New York. The parent firm will continue in charge of the laboratories and will maintain technical supervision over the work of the new company. The general offices of both companies have been moved from Dayton, O., into larger quarters at Pittsburgh. The general sales offices are being continued at 15 William street, New York, and branch sales offices have been opened in the Morris building, Philadelphia, and the Merchants Exchange building, San Francisco. I. H. Levin continues in charge of technical and research work and D. J. Tonkonogy in general charge of sales. The company is a manufacturer of oxygen and hydrogen generating plants.

* * *

Last month, the Western Electric Co., Inc., New York, passed the half-century mark of continuous operation. In 1869 the firm of Gray & Barton was formed to manufacture telegraph apparatus, electric bells and buzzers, and from this unpretentious start, at a time when present-day commercial applications of electricity were unheard of, the present company was developed. At the present time, the company's activities are world-wide and its products are used in every civilized country.

Digitized by Google

Practical Ideas for the Engineer

Still Engine—Launching Check—Cutting Airports—Improved Union—Concrete Construction Forms—Valve Setting—Raising Sunken Ship

ECONOMICAL use of power aboard cargo and other vessels is a problem that has taxed the ingenuity of engineers for many years. A method of combining in one engine the superior thermal cycle at the high temperatures and pressures of the combustion engine with the low thermal cycle of steam to deal with its rejected heat, and in the same engine to add the superior working advantages of the steam engine, is the basis of work carried out by W. J. Still and described in a recent issue of the *Journal* of the American Society of Mechanical Engineers.

The description points out that the engine is capable of using in its main working cylinder any form of liquid or gaseous fuel hitherto employed. It makes use of the recoverable heat which passes through the surfaces of the combustion cylinder, as well as into the exhaust gases, for the evaporation of steam, which steam is expanded in the combustion cylinder itself on one side of the main piston, the combustion stroke acting on the other side. It is said to increase the power of the engine and to reduce the consumption of the fuel per horsepower developed.

Its primary object is not to use the waste heat for raising steam, but first to use it in improving the thermal conditions of the working cylinder, and so insure the maximum efficiency from the fuel burned within it, diminishing as a consequence the heat lost in that operation. Since the maximum efficiency is obtained by combustion of the fuel in the cylinder, and the minimum by the evaporation of the water in the steam generator, it is evident that the larger the quantity of steam which can be generated per horsepower developed by the combustion cycle, the lower must be the heat efficiency of the whole machine.

How the Cooling System Functions

In this engine, as shown in the accompany illustration, the jacket and cooling water form part of the circulating system of a steam generator, which may be an integral part of the engine, or external to it. The cooling water, therefore, enters and leaves the jacket at a constant temperature, regulated by the pressure of the steam, the cooling being effected by converting the water into steam without raising its temperature. Excluding the radiation losses, which are kept low by lagging, all the heat which passes through the walls is thus usefully recovered in the water as steam. The temperature of the cylinder wall is uniform over the whole of its exterior surface, and the heat lost to the cooling water at each stage of the cycle—compression, combustion and expansion—is diminished.

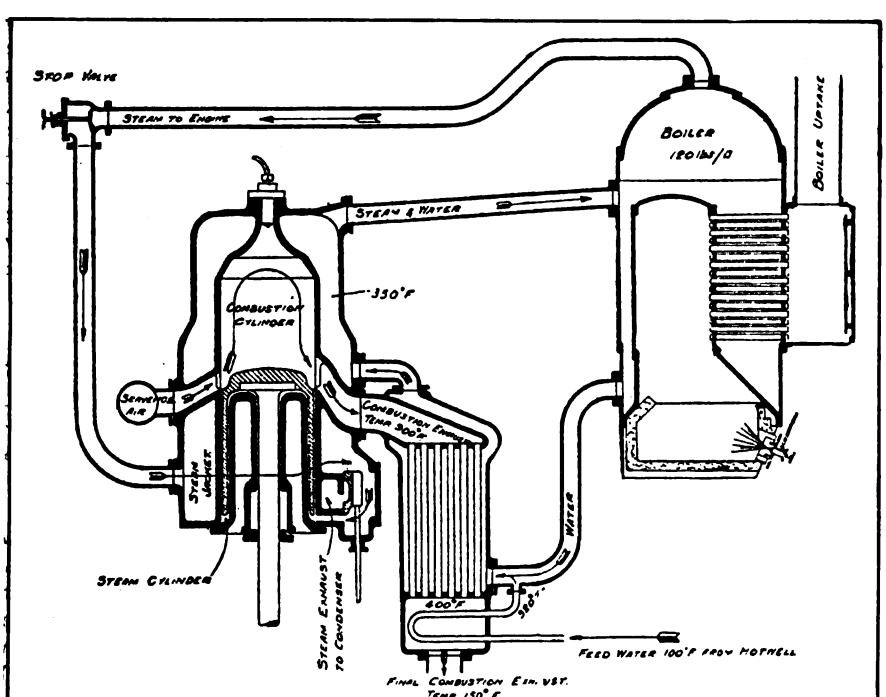
The exhaust gases after raising their quantum of steam are employed in preheating all the water required for the steam generated in the jacket water and the generator. Trials at full efficiency over long periods and steady loads show terminal stack temperatures as low as 150 degrees Fahr.

The quantity of steam capable of being generated from waste heat depends on the efficiency of the combustion cycle and the load. Some years of experimental work prove that the weight of steam recovered may attain a maximum of about 7 pounds per brake horsepower hour developed by the combustion cycle of a 4-stroke constant-volume engine at full load.

The first experimental engine constructed was a 2-stroke engine capable of developing 590-horsepower from three cylinders at 400 revolutions, bore 8 inches. It was a high-speed engine, designed with special regard to obtaining data about the recovery of steam from waste heat (jacket and exhaust). It was first operated on town gas—540 B. t. u. per cubic foot, and subsequently converted for oil fuel. Its efficiency was not high, owing to its being a 2-stroke engine with a short stroke, but its consumption per brake horsepower was 15 cubic feet per hour or 31.3 per cent efficiency, a promising result.

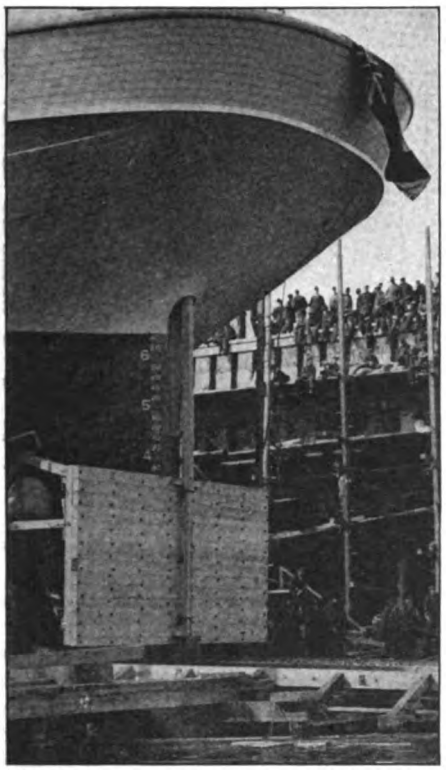
The outbreak of war prevented much progress being made in the design and construction of gas engines but the results achieved give great promise of future development, for with a combustion indicated efficiency of 36 per cent, radiation 4 per cent, boiler loss 10 per cent, there remains 50 per cent for recovery and allowing 10 per cent efficiency for the steam cycle, a gain of 5 per cent is assured, and the total indicated efficiency of the engine will not be less than 41 per cent. If 20 per cent efficiency is obtained from the steam cycle, as appears possible, the total indicated efficiency will be 46 per cent.

A gas engine which can give a brake thermal efficiency 30 per cent better than its predecessors, and which, by governor control alone, can meet any demand up to and over 100 per cent overload, while maintain-



SECTION SHOWING THE ARRANGEMENT AND OPERATING PRINCIPLE OF THE STILL ENGINE

Digitized by Google



DEVICE TO RETARD MOMENTUM AFTER LAUNCHING

ing a good efficiency at that increased output, cannot be neglected.

Four-stroke engines for gasoline and similar fuels have been built and tested afloat and ashore. A special 13½ by 22-inch, 2-stroke-cycle, heavy-oil engine with opposed pistons has been subjected to long and varied tests by representatives of various governments. The combustion takes place between the pistons, the steam acting on the return stroke at the back of both pistons. The best consumption of fuel, admiralty shale oil, was as low as 0.302 pound per brake horsepower, scavenger pump not included, over a test of of 1 hour duration. This engine developed 330 brake horsepower for 6 hours at 360 revolutions per minute, a single cylinder under waste-heat conditions. It will develop 400 brake horsepower continuously with added steam— generated by fuel under the boiler—and has developed 540 brake horsepower at 380 revolutions per minute over short periods. Combustion mean effective pressure, 128.2 pounds; steam mean effective pressure, 57.9 pounds; total mean effective pressure, 186.1 pounds. The thermal brake efficiency from below quarter load to full power is maintained at approximately 40 per cent over the whole range.

The application of Mr. Still's system to commercial marine work is being developed in England and other countries, the 2-stroke, single-piston type, in powers of 100-horsepower per cylinder and 400-horsepower per cylinder, having been adopted. Engines of this type at 120 revolutions per minute, with a 22 x 36-inch cylinder, giving 4200 shaft horsepower on two shafts, with all auxiliaries and water would approximate 600 tons.

Launching Check

Various means have been used for checking the momentum of a vessel in the water after she leaves the launching ways. Wings in various forms are often used for this purpose. The device shown in the accompanying illustration is in successful use at the Tacoma, Wash., and Portland, Oreg., yards of the Foundation Co.

The device consists of a heavy framework of planking carried on a post that occupies the position taken by the rudder post. It is also firmly braced against the propeller shafts to keep it in a rigid position athwartships with the vessel.

The Foundation Co. points out that this device has the advantage of being readily installed and that it is quickly released after the vessel is in the water with her headway checked. It is also a permanent fixture as it can be used on one vessel after another. It is held in position by wooden struts and is removed by taking out a single pin.

Marine Boiler Data

An illustrated 69-page book entitled *Marine Boiler Logic,* recently was issued by the Heine Safety Boiler Co., St. Louis. The booklet was written by Charles H. Stoddard, consulting marine engineer for the Heine company. The main part of the book relates to the design and construction of Scotch and watertube boilers for marine installations. Evaporative capacities are worked out for the two types, using coal or oil as fuel, either with natural or forced draft.

The booklet also contains a discussion of power and speed of cargo vessels, formulas being developed showing the relation between the boiler and prime mover capacity and the dimension of the hull. In making these computations, the method developed by Rear Admiral D. W. Taylor of the United States navy has been used, with certain modifications suggested by Mr. Stoddard's practical experience as a marine boiler designer.

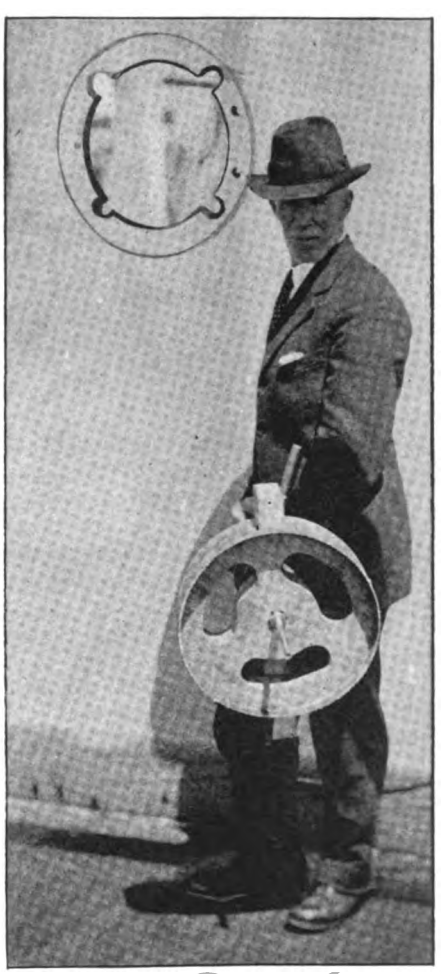
The last part of the book is devoted to a description of the construction and operation of the cross-drum type of watertube boiler developed by the Heine company for economical and practical marine service.

Cutting Airports

Fitting the airports in the deck houses of wooden ships is often a comparatively expensive operation when this work is prosecuted by hand methods. To reduce the cost of this operation, Harry Bateman, head joiner at the Ogden Point, Can., yards of the Foundation Co., devised the apparatus shown in the accompanying illustration.

The device consists of a wooden disk mounted on a spindle which fits the chuck of an ordinary air-boring machine. Around the circumference of the disk, which is made the exact size of the port frame, is mounted a piece of band saw blade. At the back of the disk is located a cross piece which projects at either end to the same extent as the width of the flange of the port frame. On one end of the cross piece a cutter knife is adjusted.

In using the device, the outer end of the spindle is inserted in a guide hole which is bored in the center of the location chosen for the air port frame. Then the power is turned on, causing the saw to cut an opening through the sheathing of the deck house. The knife on the cross piece,



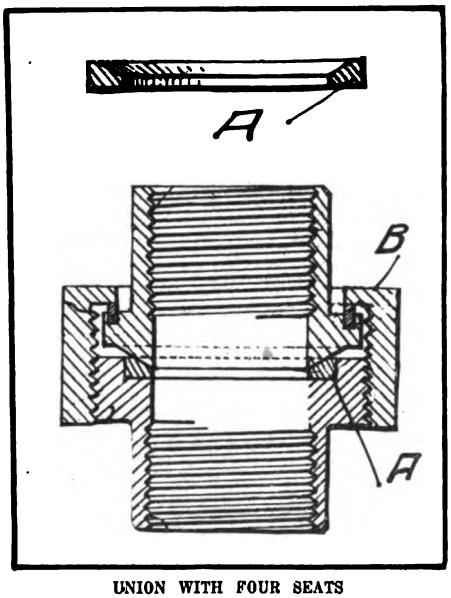
ROTARY TOOL FOR CUTTING AIR PORTS

Digitized by Google

in the meanwhile, cuts a scarf the exact depth desired for the countersinking. The work is done at one operation in about 1½ minutes. The smoothing and fitting operations, it is said, require but a few minutes more.

Improved Union

In the endeavor to provide a union that would not leak under severe usage, a Baltimore inventor, William C. Codd,



UNION WITH FOUR SEATS

recently devised and patented the coupling shown in the accompanying illustration. The inventor has incorporated a soft metal seat, *A*, at the juncture where the two members come together. Further to prevent leakage, a washer, *B*, is interposed between the nut and the male coupling member.

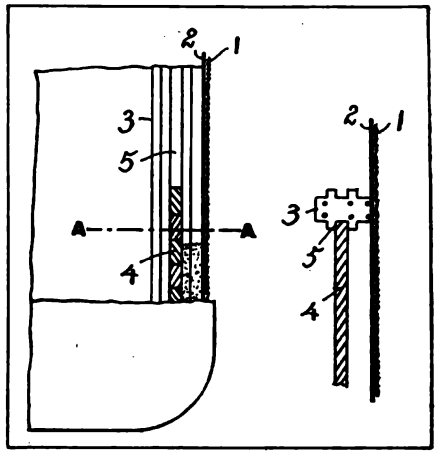
The inventor sets forth that when the sections are first put together, the coupling nut being fitted over the male member and threaded on to the female member, the flange binds against the washer, *B*, and a double connection is formed between the sections.

This results in what is technically termed a 4-seated union to distinguish it from a single-seated union more frequently called a double-seated union.

Concrete Forms

For constructing reinforced concrete vessels, a Norwegian inventor, Nicolay Knodtzon, recently obtained a patent on a process whereby special forms are constructed and used. The walls of the vessel are cast, or poured, between an outer lathing of metal netting and an inner backing consisting of horizontal boards which are guided in place and held in position in vertical slots. It is pointed out by the inventor that the boards may be inserted rapidly during the casting operation so that the pouring may always be effectively controlled from above. It is stated that the process is particularly adapted to building vessels of medium capacity from 150 to 750 tons. Concrete vessels of these sizes, it is emphasized, generally have walls which are too thin to be cast between two ordinary retaining walls built of boards.

In the accompanying illustration, the



CROSS-SECTION OF A CONCRETE SHIP SHOWING CONSTRUCTION DETAILS

view at the left is a cross section of a concrete ship's wall while the illustration at the right is a section on the line *AA* of the view at the left. The exterior lathing forms a permanent part of the vessel and is designated *1* in the illustration. This lathing is mounted on reinforcing irons, *2*, and the frame, *3*. The inner wall is formed by horizontal boards, *4*, which are placed on top of each other in the vertical guides, *5*, in the frame, *3*.

In the casting operation, the boards, *4*, are put in place in the guides, *5*, so that the level of the grout is always a little below the topmost board. Control of the casting may thus take place from the inside as well as through the metal lath from the outside. When the casting operation is complete, the inner boards are removed.

Should Valves Be Set With No Lead?

THE article under the above heading by Harry Stone in *The Bulletin* of the Lake Carriers' association, published in THE MARINE REVIEW for October, has brought the following argument from S. H. Hunter, veteran engineer on the Great Lakes:

"The subject of valve setting is one of the most interesting connected with the science of steam engineering, and the importance of correct valve setting is worthy of extended study. Taking the statement that Mr. Stone is decidedly opposed to lead, I would be pleased to have him give us some more reasons why he is opposed to lead. I would also like to add that the first question, which should be answered by the engineer who wishes to study valve motion and the correct setting of valves, appears to me as follows: What is it which determines the correct setting of a valve for a marine steam engine?

"We would also require the type of engine, a single cylinder, noncondensing, turning say over 200 a minute, fore-and-aft compound, and so on through the different types of marine engines that have been installed in the various types of our lake steamers. In my opinion that which determines the correctness of the setting of the valve is equal distribution of steam. For instance, take a 42-inch stroke vertical cylinder, high pressure, in a triple. It would manifestly be unwise to have the admission of steam unequally distributed to the extent of having the cut off take place at 24 inches on the down stroke and 18 inches on the up stroke. The ideal condition would be, say 24 inches down and 25 inches up.

"To make this matter a little more clear, it might be well to supplement the first question by another: What is point of cut off? The average answer from the engineer would be that the point at which the valve cuts the steam from any further admission into the cylinder to accuate the piston in its onward stroke, is point of cut off. A little careful thought would show that answer to be incorrect, and that the correct answer will be the point at which the piston is in the cylinder when the steam admission is cut off from any further entrance.

"With this answer accepted as correct, we can now proceed to set our valve so that the point of cut off will be given equal distribution of steam in each stroke of our piston. By the practical demonstration to be obtained by the engineer when his valve cover is removed, and he can turn his engine over with a jacking engine, he will find that it is practically impossible to obtain, with the Stephenson link valve motion and either plain slide or piston slide valve, this much to be desired object by reason of what is called the angularity of the rod; the engineer will find that

Digitized by Google

the steam follows longer in the down stroke than in the up stroke.

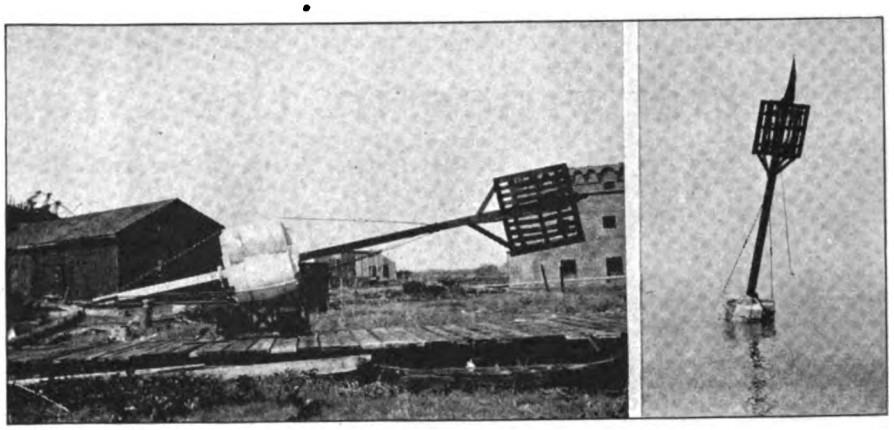
"This difference becomes greater when an equal amount of lead on the top center and the bottom center is given. Now, if we will leave the eccentric as it is on the shaft, and merely lengthen our eccentric rod and raise the valve until we have, say a negative lead on the top center, and what might be termed a considerable lead on the bottom center, we might approach a more equal distribution of steam in both strokes.

"I agree with Mr. Stone that excessive lead is injurious but would suggest that better results can sometimes be obtained by having considerable negative lead as we term it, the valve set blind, on the top center with a fairly good opening for lead on the bottom center."

Signal Targets

To provide cheap signals that could be readily handled was the problem confronting engineers of the United States coast survey while doing wire-drag work in the summer of 1918 near the westerly Florida reefs. Nearly all of the work was out of sight of land, the only signals available being three distant lighthouses and a tall hydrographic signal built on an isolated sand key.

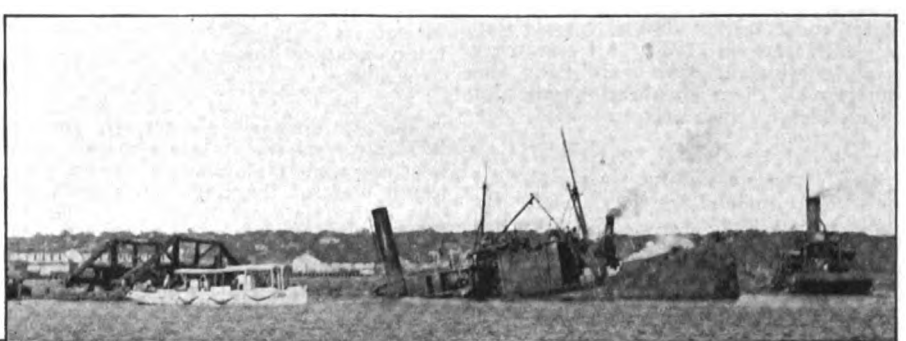
To meet this situation they devised several floating targets that proved valuable in speeding up the work. These signals were inexpensive and were easily handled from a launch. In making them, three strong barrels were firmly lashed and braced to a center pole about 25 feet long, at the bottom of which was a counterweight. The mooring chain was fastened to a bridle at the water line. With these targets, the first wire-drag work ever done out of sight of land, in open and entirely exposed waters, was performed and they proved entirely satisfactory.

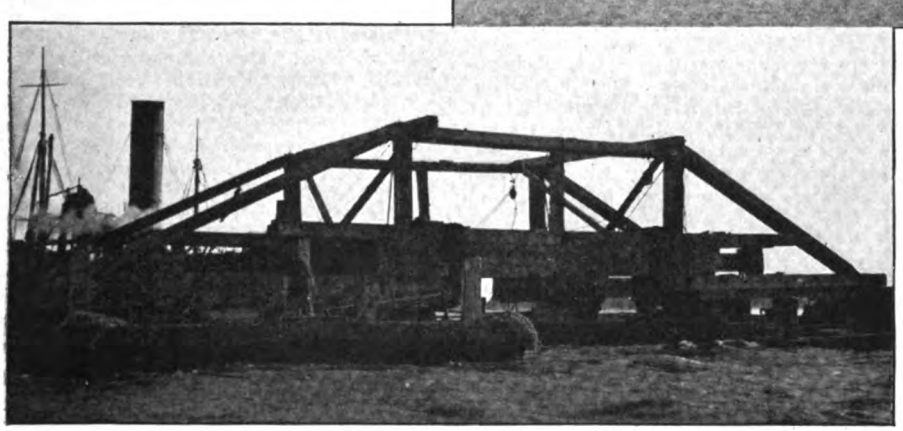


FLOATING TARGET FOR WIRE-DRAG WORK MADE OF FOUR BARRELS LASHED TO A CENTER SPAR

Air and Slings Raise Sunken Ship

SALVING of sunken vessels is an arduous undertaking even under the most favorable circumstances when plenty of equipment is available, but such work undertaken thousands of miles away from large maritime centers calls for unusual ingenuity. An excellent example of salvage work carried out successfully under many difficulties is that on the ZAMBEZIA which vessel recently was successfully raised after lying on the bottom of Delagoa bay, on the east coast of South Africa, for over two years.





LOWER ILLUSTRATION SHOWS HOW THE STERN WAS RAISED BY WIRE SLINGS PASSED UNDER THE VESSEL—UPPER VIEW IS THE SHIP AS SHE LAY PARTLY SUBMERGED

The ZAMBEZIA is a British-built vessel of 1281 tons and at the time she met disaster, was owned by the Portuguese Mail Steamship Co. While loaded with gasoline, ready to sail, she accidently caught fire and was towed to the south side of the harbor where she was sunk by gunfire from a Portuguese man-of-war. A local syndicate bought the vessel from Lloyds and later raised her, only to lose her when she sank again, this time in deep mud.

Then she was bought at auction by Thesen & Co., Ltd., Knysna, for a sum said to be under $10,000. After a year's work the company succeeded in raising her notwithstanding that she was full of mud. In floating her, the forward compartments were pumped full of air while her stern was raised off the mud by means of steel cables passed over timbers which were placed athwartships across three barges. Thus raised off the bottom, she was towed 1½ miles. The cost of reconditioning the vessel for service is estimated at approximately $100,000.

Digitized by Google

Activities in the Marine Field

Latest News From Ships and Shipyards

Lake Yards Get Contracts for 1920

THAT shipbuilding on the Great Lakes is not to languish during the coming year is evidenced by the fact that contracts have been recently announced for building deep-water craft for 1920 delivery. This is gratifying in its acknowledgement of the worth of these canal-size, lake-built vessels which are now widely known as they are ploughing the seven seas. Probably nowhere throughout the world are shipyards more efficiently managed than they are on America's vast inland seas. This claim is supported by the splendid performance of lake-built vessels during the war emergency. The American Shipbuilding Co., Cleveland, it is reported, will build a number of vessels for 1920 delivery at tidewater, work on which will be started at an early date. Material for these boats, which are to be full Welland canal size, has been ordered. The Manitowoc Shipbuilding Co., Manitowoc, Wis., and the McDougall-Duluth Co., Duluth, have each booked orders for two steamers for the Atlantic coast trade. These vessels will be delivered in 1920. All steamers now building at lake yards for the Emergency Fleet corporation will not be delivered this season.

* * *

The steamer PENGUIN, a product of the Ohio Shipbuilding Co., built for the East Coast Fisheries Co., New York, passed her trial trip successfully and has left for the coast.

* * *

The forward section of the steamer CHARLES R. VAN HISE arrived in Ashtabula, early in November, in tow of the steamer CENTRAL WEST. This vessel, which was to be taken to salt water, is to be reconstructed for use on the lakes.

* * *

Enough coal to load the barge BLOOM and the steamers TOMLINSON, MUNISING and ALASKA, at Sandusky, was released by the government recently. The BLOOM came into Sandusky harbor just before the coal at, and in the vicinity of, the Lower Lakes Dock Co.'s plant had been seized. The other vessels arrived in Sandusky later.

* * *

A cut has been made in the supply of fuel for Canadian steamers and boats of that class will be allowed only enough coal to take them to their home ports to lay up.

* * *

Ore carriers are being put to considerable trouble in getting on cargoes at the head of Lake Superior. Some of the vessels have been in port a week. The ore is frozen and is handled slowly. At Duluth two crews were put to work recently steaming ore on the Missabe dock.

* * *

The steamer NORTH STAR of the Great Lakes Transportation fleet had a rough passage coming down the lakes recently. After weathering a stiff northwest gale on Lake Superior she came through the Soo 58 hours out of Duluth. She had her starboard rail stove and lost nearly all of her deck load of shingles.

* * *

The steamer HOOVER & MASON lost an anchor and 150 fathoms of chain in Lake Superior recently.

* * *

The steamer A. F. HARVEY recently went into drydock No. 1, Cleveland, for repairs to her rudder.

* * *

The steamer KEYVIVE had eight plates replaced while in drydock at Ashtabula, O.

* * *

Steamers of the C. & B. line were held in port at both ends of the route by heavy weather during the early part of November.

* * *

The ore firm of Harvey H. Brown & Co., Cleveland, has moved its office quarters from the sixteenth to the thirteenth floor of the Rockefeller building. The entire sixteenth floor of the building is now occupied by the Pittsburgh Steamship Co.

* * *

According to a current report, a Buffalo firm has purchased the steamers G. A. FLAGG, SENECA and BETHLEHEM from the shipping board for operation on the Atlantic coast. The FLAGG formerly was owned by the Calumet Transportation Co., of which M. A. Hanna & Co. are managers, and the SENECA and BETHLEHEM, which were package freighters, were operated by the Lehigh Valley Transportation Co.

* * *

A 35-mile northwest gale with snow set in at Duluth on Nov. 3 which stopped all loading and moving schedules in the harbor. The steamer G. J. GRAMMER, after being out several hours, was compelled to return with a disabled rudder.

* * *

According to a report recently received by the underwriters, the steamer CITY OF MUSKEGON which was wrecked at the entrance of Muskegon harbor on Oct. 29, is fast breaking up. The United States engineer in charge has asked for bids for removing the wreck. The MUSKEGON was driven into the pier by a gale with which she successfully battled all the way across Lake Michigan from Milwaukee. The vessel was operated by the Crosby line and the wreck is one of the worst on the lakes this season. Fourteen persons lost their lives while the missing were placed at 21. The steamer was insured for about $100,000 and her cargo for $56,000. She was repaired during the summer at a cost of $25,000.

* * *

The steamers LAKEPORT and HOWARD W were in collision near Coteau early in November and both vessels sustained damage. The LAKEPORT proceeded to Montreal and the HOWARD W to Ogdensburg.

* * *

Capt. Clinton G. Ennes, a well known Great Lakes vessel captain, died at St. John's hospital, Cleveland, on Oct. 28, after a long illness. Captain Ennes was 74 years old and had followed the lakes from boyhood. Before coming to Cleveland, he was in command of vessels of the Whitney fleet, Detroit. He brought out the steamer WILLIAM FAIRBAIN of the Bessemer fleet and until six years ago he sailed boats of the Pittsburgh fleet. His last command was the H. H. ROGERS. He is survived by his widow and one son, Capt. Claude M. Ennes, who sailed steamers of the Becker fleet for a number of years.

* * *

The Wisconsin Transport Co., incorporated for $300,000, has bought the steamer PURITAN which came to the lakes from Boston. The company also has bought the steamer CROSBY and all holdings of the Chicago, Racine & Milwaukee line. The company will inaugurate a daily service between Milwaukee and Chicago and intermediate points. Among the promoters of the enterprise are E. W. Seymour and R. F. Church, Chicago; and E. O. Henderson, Milwaukee.

* * *

The steamer DUSSAULT, a sandsucker owned and operated by the Port Clinton Lumber & Coal Co., went aground late in October on one of the sandbars east of the entrance to Port Clinton harbor.

* * *

High winds that swept Lake Erie during the latter part of October caused some damage to shipping in Buffalo harbor and delayed many vessels from putting to sea. The most serious accident was a collision between the supply tug HUSTLER and a passenger steamer. The tug was so badly smashed that she sank in a few minutes. The crew, however, were rescued. The steamer suffered no serious damage. The gale,

Digitized by Google

which came from the west, reached a velocity of 72 miles an hour.

* * *

The steamers NORTH STAR and RICHARD TRIMBLE were in collision at Duluth late in October.

* * *

The steamer VIKING bent several of her plates forward when she struck a pier on entering Erie harbor recently. Repairs were undertaken at Erie.

* * *

The south half of the river entrance channel at Buffalo has been swept to a depth of 23 feet up to within 20 feet of the south pier. The Lake Carriers' association has issued a notice to masters advising that vessels destined to the Blackwell canal may be loaded to the Lake St. Clair draft of 20 feet 4 inches. No change has yet been made in the recommended draft of 19 feet 6 inches for vessels going to docks in the Buffalo creek.

Late News From Atlantic Seaboard

THE tank steamer WILLIAM GREENE arrived in Boston recently with 2,772,000 gallons of oil, one of the largest cargoes of this commodity ever brought to that port.

* * *

The commissioner of lighthouses has sent out notices of a change in the characteristics of the light on Stone Horse lightship in Nantucket sound. In the future, a flashing white light will take the place of the previous fixed light.

* * *

The Massachusetts waterways commission met recently to consider the threatened discontinuance of the Victory shipbuilding plant at Squantum, Mass. The importance of continuing this plant as an industry for Massachusetts was declared in resolutions unanimously adopted.

* * *

The submarine R-12 recently completed at the Fore river yards of the Bethlehem Shipbuilding Corp., Quincy, Mass., has been placed in commission at the Charlestown navy yard. There are now 37 ships at the yards, some undergoing repairs but many ready to be sent to sea at any time.

* * *

The MERIAM LANDIS, a 4-mast schooner named for a niece of Judge K. N. Landis of Chicago, was launched recently at the yards of Percy & Small, Bath, Me. The vessel registers 904 tons and will be used for cargo purposes.

* * *

The new steamship LAKE FAULK recently completed on the Great Lakes has taken a cargo of bar steel and general merchandise at Boston for Kobe, Japan, and Manila, P. I. This is the first boat to start a new line to the Far East which will be operated by John S. Emery & Co.

* * *

The new steamship WORCESTER named for Worcester, Mass., arrived in Boston after completing her first round trip to Belgium. Several of her plates were sprung in a rough sea and it is reported that she will go into drydock for repairs.

* * *

Five steam trawlers have been purchased from the French government by the East Coast Fisheries Co. and will be added to the fleet now operating off the New England coast. All will carry wireless and are fitted with modern machinery. They are 150 feet long and have a capacity of approximately 400,000 pounds of fresh fish each. The company is now constructing five additional trawlers, four of steel and one of wood.

* * *

The Brazilian steamship IGUSSAU was floated recently at Boston harbor after being in drydock for over a month, undergoing repairs.

* * *

The submarine R-34 was launched during October at the Fore river shipyards of the Bethlehem Shipbuilding Corp., Quincy, Mass. This is the thirteenth submarine completed this year at this yard.

* * *

A restraining order prevented the advertised auction sale of a newly completed steamer hull in the yard of the United States Shipbuilding Corp., Portland, Me.

* * *

The destroyer REID, which was successfully launched recently at the Victory plant at Squantum, Mass., is said to be a record vessel in point of rapid construction. In just 30 working days after the laying of the keel, the hull had slipped from the ways and the completed boat is expected to be delivered before 60 working days have elapsed from the time work started.

* * *

The Boston Export Round Table club, an organization composed of men engaged in the export business, made an inspection tour of the harbor and local docking facilities recently, following out its program of becoming better acquainted with the harbor conditions.

* * *

The Cunard steamship PORT HUNTER, which was sunk some time ago with a $5,000,000 cargo of army supplies near Vineyard sound while on her way from Boston to New York, has since been the object of wholesale plunder and loot, said to have been carried on openly by many small craft. An investigation is now being made and much interest is evidenced because of the marine salvaging laws which are said to cover the action of most of the removal of the vessel's cargo.

* * *

The British steamer, CITY OF LAHORE, docked some days ago at Boston with several East Indian planters aboard who had made the 9000-mile trip for the purpose of buying American agricultural implements.

* * *

The WINNEFREDIAN of the Leyland line brought 2023 Chinese laborers on her last trip to Boston from France. These are men who worked on railroad and dock construction during the war. They were landed at Boston and proceeded to Vancouver, B. C.

* * *

The trial is still in progress at the United States district court, Boston, over the question of purchasing the Cape Cod canal by the government. Engineers' reports approve of the nature of the work done on the canal during the time it has been under government control.

* * *

The submarine S-14, the largest one of its kind to be built at Bridgeport, Conn., was launched recently from the Lake Torpedo Boat Co. yards. She is 237 feet long and has a 1200-ton displacement, when submerged.

* * *

The steamship MERRY MOUNT, launched some time ago at the Groton Iron Works, Groton, Conn., and subsequently sold to the Ripley Co., has again returned to the ownership of the United States Steamship Co., owner of the Groton Iron Works.

* * *

The DON JUAN, which was captured by Admiral Dewey at Manila after a heroic stand, is now at the navy yard at Portsmouth, N. H., where she is to be converted into a coastwise tug.

* * *

A new fog signal was established Nov. 1 at East Breakwater light, Nantucket harbor. In thick weather, a bell now strikes once every 15 seconds.

* * *

The first vessel to come to Boston from Germany since the war was the steamer YAQUINA, which arrived from Hamburg in ballast.

* * *

Plans have been prepared for a new freight ship for the Eastern Steamship Co. which will cost approximately $600,000 and will have 2000 tons cargo carrying capacity. The boat is expected to be ready for service by next June and will be put on the line from Boston to New York. She will be an oil burner.

* * *

The Groton Iron Works, Groton, Conn., recently launched the QUINNIPAC. She was sponsored by Mrs. Isaac M. Ullman.

* * *

The oil tanker HADNOT, built for the shipping board at the Quincy, Mass. yards of the Bethlehem Shipbuilding

Digitized by Google

Corp., was recently launched, steam up and 99.9 per cent complete. She was christened by Mrs. Anne Gould, Quincy, and was immediately placed in commission.

* * *

The Black Star line, the West Indian negro enterprise, is said to be contemplating the purchase of another vessel about the same size as the YARMOUTH, recently acquired from Magill & Co.

* * *

The four members of the crew of the British schooner ONATO, who were taken off the waterlogged vessel and brought to Philadelphia by the steamship ZIRKEL and held under suspicion of having killed the captain and the mate of their vessel during a mutiny, had a hearing before Thomas P. Porter, British consul. After a thorough investigation, the men were exonerated and ordered to be treated as honorable shipwrecked seamen and sent back to their homes in Newfoundland.

* * *

The 6-mast schooner WYOMING, the largest vessel of her class afloat, is reported to have paid for herself twice over since she was put in commission three years ago. She is owned and operated by the France-Canada line. It will not take long for her to pay for herself again, according to the high freight rates she is receiving. She recently was chartered to load coal for Genoa at $23.50 a ton. Her capacity is approximately 6000 tons.

* * *

The Philadelphia harbor tug ARAL, owned by Capt. P. F. Martin, recently became tangled in her own hawser, capsizing at the Walnut street wharf. The ARAL is known along the river as a Jonah, having come to grief several times.

* * *

The United States consul general at Buenos Aires has advised the state department that the Argentine law requires that slop chest and other ships' stores be manifested in detail, with accurate number, quantity or weight and that if this is not done, vessel masters will be liable to heavy fines followed by confiscation. The consul urges that this notice be given wide publicity.

* * *

The Pacific Mail Steamship Co. has inaugurated a service between Baltimore and San Francisco via the Panama canal with the recent sailing of the POINT BONITA. The voyage is expected to consume approximately 30 days. The vessel will touch at several Central American ports as well as San Pedro and Los Angeles.

* * *

The steamer MOUNT HOOD was recently destroyed by fire in the River Plate off Montevideo. Fire was started by the explosion of an oil tank. The MOUNT HOOD registered 2433 tons and left Mobile, Ala., on May 27 for Bahia Blanca, Argentina, and proceeded from that port to Montevideo. The crew was rescued.

* * *

The oil tanker BRAMMEL POINT, the first motorship of its class to be constructed in the United States, will be equipped with three diesel engines, replacing the present engines. The work will be done by the Baltimore Dry Docks & Shipbuilding Co., builder of the vessel. The BRAMMEL POINT is 4990 tons deadweight and is 293 feet long.

* * *

The Baltimore Southern Navigation Co. will operate a service between Philadelphia and Baltimore carrying freight for Newport News, Norfolk and other southern cities, according to a recent announcement. The service was started with two vessels, the J. H. STEEL and the HELEN STEEL.

Acquires Fast Ships

TWENTY-FIVE of the 43 ex-German liners of over 10,000 tons are under American registry while six sail under the English flag. Of the 16 now operated by the shipping board, 14 have been given new names. The list includes the LEVIATHAN, *formerly the* VATERLAND, *a vessel capable of logging 24 knots; the* AGAMEMNON, *formerly the* KAISER WILHELM II, *23 knots; the* VON STEUBEN, *formerly the* KRONPRINZ WILHELM, *23 knots; the* MOUNT VERNON, *formerly the* KRONPRINZESSIN CECILLE, *23 knots; the* GEORGE WASHINGTON, *19 knots, and the* AMERICA, *formerly the* AMERIKA, *17½ knots. Ten of the 16 vessels formerly belonged to the Nord-Deutscher Lloyd Co. and six to the Hamburg-Amerika line.*

Activities Along the Gulf Coast

CONTRIBUTIONS of $2145 from New Orleans business men have been received toward the $10,000 being raised in that city for obtaining rights of way, abstracts of titles and other expenses for the promotion of the intercoastal canal betwen the Louisiana port and Brownsville, Tex. The canal, it is believed, will eventually take the course of the Barataria and Lafourche canal, which comes into the Mississippi at Westwego, just opposite New Orleans, and which connects all the 5000 miles of inland waterways of western and southern Louisiana with the Mississippi.

* * *

Three steamships of Japanese lines made their first visits to New Orleans during November. They were KAISHO MARU, operated by the Trans-Oceanic Co. and the PANAMA MARU and TOMURO MARU, of the Mitsubishi Gobi Kaisha. All give direct connection with Hong Kong and Yokohama, via the Panama canal. The J. H. W. Steele Co. is agent for both lines in New Orleans.

* * *

The Ecuador Steamship line was organized and incorporated in New Orleans in October, with O. E. Hodge, New Orleans and Moss Point, Miss., as president and Joseph D. Barksdale, secretary and general manager, with offices at 911 Commercial Bank building. Dr. Carlos A. Bermeo, consul general of Ecuador at New Orleans, will be South American representative, with headquarters in Guayaquil, Ecuador. The first steamer of the new line, NIKA, recently completed by the Hodge Shipbuilding Co., Inc., at Moss Point, made her first sailing Nov. 15. She is of 3500 tons.

* * *

Fire which threatened the Pinto island plant of the Alabama Drydock & Shipbuilding Co., Mobile, Ala., Oct. 28, was extinguished with small damage by 2000 employes of the plant. The fire started in the ways on which a barge for government use at Panama is being constructed.

* * *

The new steamboat wharf at the municipally owned cotton warehouse and compress, New Orleans, has been completed. For the first time in the history of the port, river steamers are docking at a wharf other than the old steamboat landing at Canal street. Capt. L. V. Cooley's packet, AMERICA, was the first to bring cotton to the warehouse landing. The AMERICA has been put into regular service between New Orleans and Greenville, Miss., touching at about 12 towns enroute. This is the first time in 10 years that New Orleans has had steamer connection with Greenville.

* * *

Direct water transportation between Memphis, Tenn., and Havana, Cuba, is announced by the Sugar Products Co., New York, which states that 15 ships have been assigned by the shipping board to carry blackstrap molasses from the Cuban port to Memphis and return with miscellaneous cargoes. Steamers of 6, 8 and 12 feet draft will be used, according to the rise and fall of the river.

* * *

New session of the United States shipping board's free marine engineer school, at Tulane university, New Orleans, opened Nov. 3, with James M. Robert in charge. The October class, which just closed, was the largest in the history of the school, but enrollment for the new session exceeds that of the last.

* * *

The first ship of the new Lloyd-Brasileiro Steamship line, loaded with 60,000 bags of coffee, arrived in New

Digitized by Google

Orleans late in October, establishing direct connection for coffee shippers between the Louisiana port, Rio and Sao Paulo. Prior to the opening of this service, the only line operating steamers between New Orleans and Brazilian ports was the Mississippi Shipping Co. The addition of the new line was welcomed by coffee importers and will also be of use to all exporters up and down the Mississippi valley.

* * *

Information regarding Florentino Garcia, a Spanish seaman, living in Ybor City, Fla., is desired by his wife. Her address is P. O. box 184. Garcia is described as 5 feet 8 inches in height, sandy, age 30, with a scarred right jaw.

* * *

Two steel steam towboats and three large self-propelled barges, for use on the Warrior river barge line, will arrive in Mobile, Ala., Jan. 1, according to announcement by government barge line officials at the Alabama port. The barges are 280 feet long, 49 feet beam, 10 feet deep in the hold, and draw 7 feet. Work is progressing on terminals at the various towns along the Warrior and Tombigbee rivers.

* * *

The TORINTO, a 6000-ton steel ship, built for the Italian government, was launched Oct. 29 from the yards of the International Shipbuilding Co., Pascagoula, Miss., where eight sister steamships and four 12,000-ton steamers are being built for the same government.

* * *

The Mobile Shipbuilding Co., Mobile, Ala., launched CAPITAL OF NEBRASKA, a 5000-ton steel steamer, late in October. Miss May Pershing, sister of General Pershing, was named sponsor. Two sister ships are on the ways of the same company and will be launched before the new year.

* * *

The American flag has been raised over one of the four 9600-ton steel steamships the Doullut & Williams Shipbuilding Co., Inc., is building for the shipping board at the yard on the industrial canal, New Orleans. The hull has been completed as far as the forecastle deck, and will be launched probably before the end of November. It will be outfitted in the yards of the company. Mayor Martin Behrman of New Orleans has asked the shipping board to name the vessel NEW ORLEANS.

* * *

The Chickasaw Shipbuilding Co., Mobile Ala., has changed its name to the Chickasaw Shipbuilding & Car Co., and has assumed control of the fabricating plant of the Tennessee Coal, Iron & Railroad Co., at Fairfield, Ala. Steel is fabricated at this plant for the yards of the Chickasaw company which is planning to launch its first ship in December.

* * *

The Gulf Tropic Supply Co., a new firm, has been organized by R. L. McChesney and F. J. Picone, New Orleans, and has opened offices at 204 Camp street, to handle ship and mill supplies.

Up and Down the Pacific Coast

SOME developments are expected in the steel shipyard situation on Puget sound in the near future. The various yards are completing their government contracts and the operators are looking to the future. At the Skinner & Eddy plant, Seattle, four hulls are under construction for owners' account. At all the yards, men are being laid off and the yards are preparing to get down to a peacetime basis of competition. As far as can be learned, no private contracts have as yet been placed in Seattle, but Puget sound builders are looking for business, satisfied that they can successfully compete with any other section. Seattle steel yards recently sent three hulls into the water aggregating 28,200 deadweight tons and the remaining contracts are being completed and delivered in fast time. Skinner & Eddy have now launched 57 hulls. It is reported that David Rodgers, formerly general manager of the Skinner & Eddy plant, is figuring in a deal which will transfer the ownership of one of the Seattle yards. Mr. Rodgers is in Seattle after a trip east during which he was in consultation with shipbuilding interests at Montreal and elsewhere. He states that he is not yet ready to announce his plans.

* * *

During the past month, the Todd yards, Tacoma, Wash., were idle due to the controversy over the 8 cents per hour increase which the shipping board originally prohibited and which almost precipitated a general shipyard strike.

* * *

The movement of freight between San Francisco and Puget sound has been greatly retarded during the last month due to the strike of longshoremen at San Francisco. For several weeks, the Pacific Steamship Co. kept several of its liners idle in Seattle because of the labor troubles and only the company's fast express passenger steamers have been operating, no cargo being taken for San Francisco. The situation is somewhat improved now although the strike is not yet settled and the idle vessels are gradually returning to service.

* * *

Representatives from the various commercial bodies of north Pacific ports were in San Francisco recently attending a conference which intends to request from the shipping board additional allocations of modern vessels for transpacific trade. It is particularly desired that fast passenger vessels be assigned to the Pacific coast so that freight and passenger routes may be built up with Manila and Australia, in particular, as well as China and Japan. There is some feeling that the shipping board has not given the interests of the Pacific as much consideration as they deserve. It is expected to lay the facts before the board in the hope that more ships will be placed on the Pacific routes.

* * *

The Union Sulphur Co. has purchased one of the 8800-ton steel hulls built by the Northwest Steel Co., Portland, Oreg. The vessel was launched recently and christened JOHN R. GORDON.

* * *

To replace the famous old whaler BEVEDERE, which was crushed in the ice of the Arctic ocean last month, the Hibbard-Swenson Co., Seattle, has purchased the barkentine THRASHER, which came to Seattle from San Francisco. The THRASHER is an old time whaler and cargo carrier in the Pacific. She will be used by her new owners in trading expeditions to Siberia and the Arctic. When the BEVEDERE went down she took a cargo of $200,000 worth of furs and other products of the Far North. The members of the crew escaped.

* *

Advices from the Orient state that the Osaka Shosen Kaisha, one of the two big Japanese lines maintaining regular service between Puget sound and the Orient, has placed orders for two modern passenger and freight carriers with yards at Nagasaki. This company has been doing an increasing business and now finds it necessary to add to its already extensive fleet.

* * *

Grays Harbor, Wash., is expecting the government to establish one of the largest and most powerful radio stations on the Pacific coast at that point. According to estimates the cost will be $1,000,000.

* * *

When the Canadian Pacific liner EMPRESS OF ASIA sailed from Vancouver, B. C., recently she had 4700 persons aboard, said to be the largest number ever crossing the Pacific in one ship. The vessel carried 2000 Chinese coolies, 351 first cabin, 100 second and 700 steerage passengers besides the crew. The British steamer TYNDAREUS, which left Victoria recently, had more than 3000 passengers, most of them Chinese coolies returning from France.

* * *

Four Japanese fishing schooners arrived recently from the Okhotsh sea with cargoes of cod and other fish and discharged at Puget sound ports. This was an unusual departure, as heretofore no cargoes of fish have come to Puget sound from the Orient. The vessels returned with cargoes of salt.

Digitized by Google

Equipment Used Afloat, Ashore

Plate Planer—Machining Irregular Holes—Welding Torch—Welding Process—Draft Gage—Cargo Winch—Line Throwing Gun—Portable Furnace

TO MACHINE ship plates in an accurate and economical manner calls for special tools designed for the purpose. Owing to the size of the material, means must be provided for locating the work quickly while the clamping arrangement must be adequate to take the thrust of the cutting tools.

The plate planer shown in the accompanying illustration was recently developed by the Cleveland Punch & Shear Works, Cleveland. It was designed to expedite rapid production and it embodies several distinctive features.

The bed is box section carrying the ways for the carriage and the surface on which the work is located. Rigid housings are bolted at each end. These are connected by a cross rail which carries the pneumatic jacks that hold the work in place. The carriage is fitted with a tool holder carrying two tools which have an in and out adjustment. To save time, the tools cut continuously. One is in operation while the carriage traverses to the right while the other cuts while the travel is in the opposite direction. The tools are so arranged that the one not in operation does not drag over the work. The tool holder is of the swiveling type, rotating around a king pin. A handle located just behind the hand wheel is for the purpose of swiveling the tool holder manually if desired.

The operator rides on a platform with the carriage which reverses automatically at the end of each stroke. The operator can reverse the carriage at any point of its stroke without leaving his platform. Thus, if upon starting a cut, it is seen that it is not deep enough, he can immediately reverse the cut, feed in deeper and start again. The carriage is traversed by a screw which rests in a trough for its entire length. This screw is fitted with ball thrust bearings at each end. The carriage is provided with a safety device so that if for any reason the reversing mechanism should fail to function, the carriage by coming in contact with the safety arrangement, breaks the current which brings the carriage to a stop almost instantly.

The pneumatic jacks for holding the plate in place are each equipped with an air cock. This arrangement permits of shutting off any number of cocks when operating upon narrow plates. All operating jacks may be opened or closed simultaneously from any point of the carriage travel.

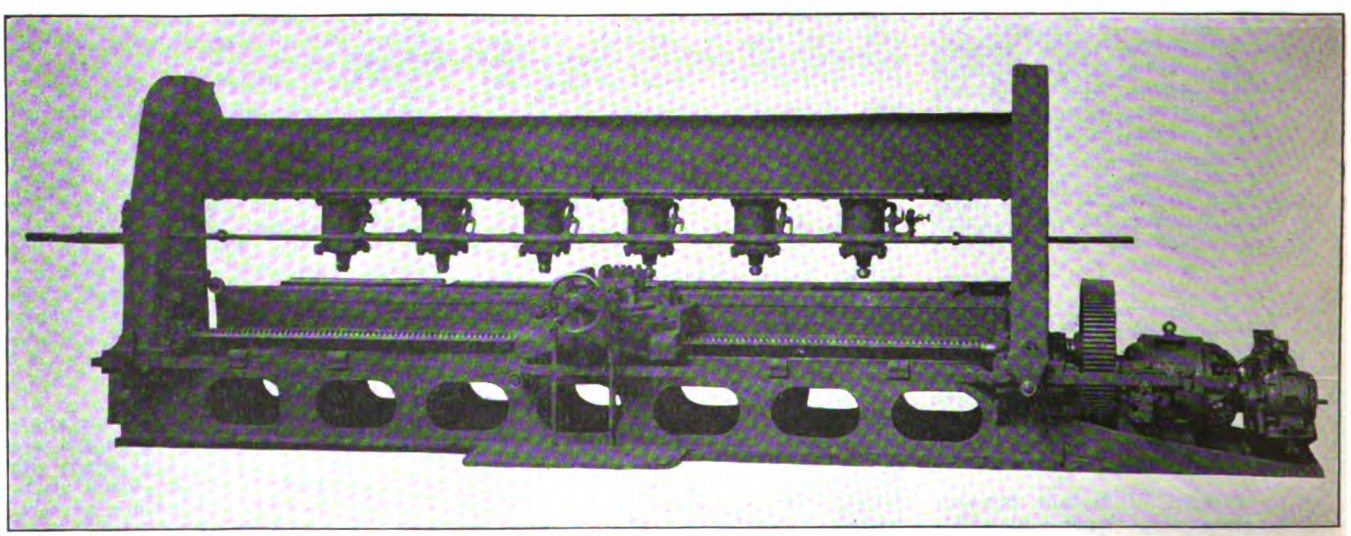
The planer is driven by an automatic reversing, direct-connected 40-volt, 3-phase, 60-cycle motor. The electrical equipment also includes a motor-operated brake which is used as a safety attachment. The drum of the brake is keyed to an extension shaft on the main driving motor and the mechanism is so arranged that should the current fail to break, the motor brake will automatically set itself. The electrical equipment also includes a button for starting and stopping, and in cases where there is no objection to trailing wires, the button may be mounted on the carriage. The push button may also be mounted on one of the housings.

Machining Irregular Holes

The device shown in the accompanying illustration recently was developed by the Watts Bros. Tool Works, Turtle Creek, Pa., for drilling square and irregular holes such as triangular and hexagonal. The equipment consists of three essential parts, a full floating type chuck, a special cutting tool and a guide plate. It can be used in the milling machine, lathe or upright drill, and, is recommended for work than cannot be readily broached or worked to shape by other hand methods.

On marine work, the device can be used to advantage in machining square holes, working out the ends of steam ports, machining forging dies, etc. The chuck is held in the machine by means of a taper shank. The guide plate that controls the movement of the cutting tool is fastened in place over the work.

The first step recommended is to drill a round hole in the piece to be worked on. This relieves the cutting tool of undue strain. In working comparatively soft material, however, it is not necessary to drill this clearance hole. It is recommended that the depth of holes machined be limited to three times the diameter of the drill. The device is furnished in four sizes with capacities ranging from ¼ to 1½-inch holes. The guide plates



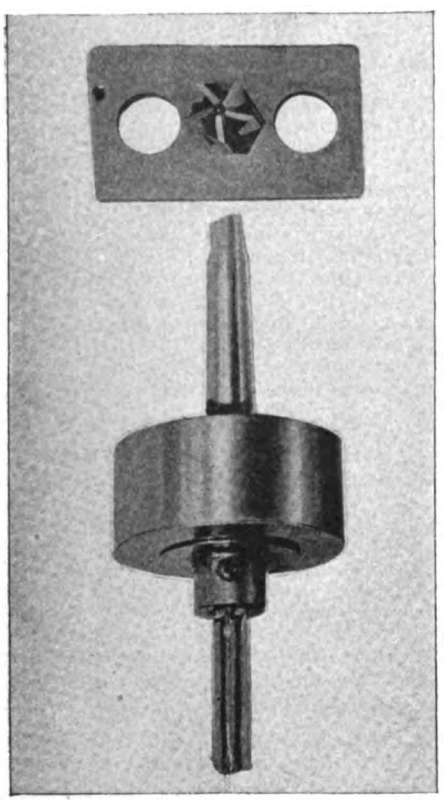
ELECTRICALLY DRIVEN PLATE PLANER EQUIPPED WITH PNEUMATIC JACKS FOR HOLDING THE WORK IN PLACE

Digitized by Google

are ordinarily made of round shapes. It is said that the device works satisfactorily on all materials ranging from high carbon and special steel to such soft materials as wood. The chuck can also be used to advantage as a driver for floating type reamers. The device is said to be accurately made and efficiently operated.

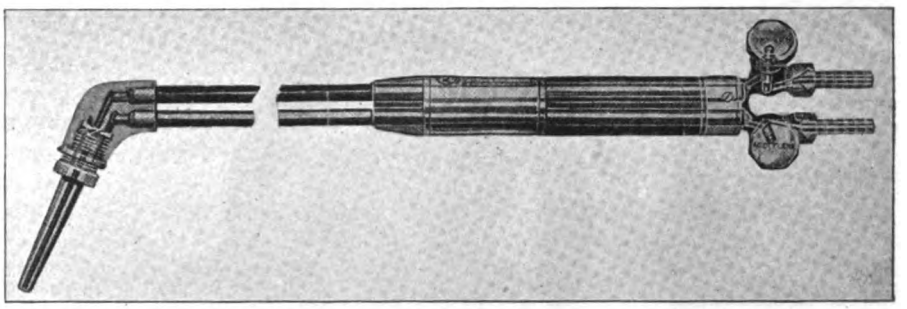
Welding Torch

A new welding torch, which embodies a number of unusual features, was recently developed by the Air Reduction Sales Co., New York. The torch is shown in the accompanying illustration. It is said to include only a small number of parts. The torch heads are drop-forged of the same material as the tip, so that both



CHUCK DRILL AND GUIDE PLATE FOR WORKING OUT IRREGULAR SHAPED HOLES

parts are subject to the same coefficient of expansion and contraction. To prevent operators making the mistake of connecting the feed hose to the wrong connection, the oxygen valve is equipped with a right-hand thread and the acetylene valve with a left-hand thread, the nuts on the feed hose having corresponding threads. The handle is knurled and bears a stamped gas pressure table which serves as a permanent source of information for the operator. The valve handles are octagon shape and are located on the left-hand side of the torch. It is claimed that on account of the manner in which the gases are mixed, this torch will not backfire.



WELDING TORCH WITH HEAD AND TIP HAVING SAME COEFFICIENT OF EXPANSION

Approves Process

A further development of welding in American shipyards is anticipated from the recent approval by the American bureau of shipping of the thermit process for welding stern frames, rudder frames, and other heavy sections on ships registered under its classification. The only qualification is that this bureau be notified sufficiently in advance to have a surveyor in attendance during the welding operation as well as to inspect and test the weld when completed.

Draft Gage

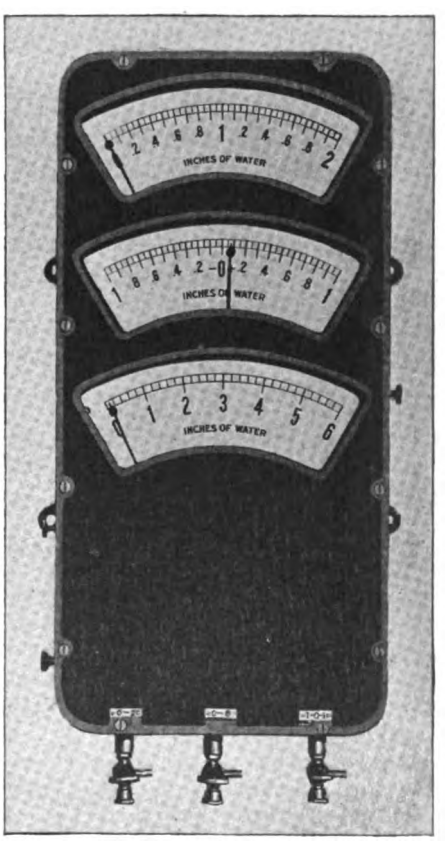
One of the many problems confronting the chief engineer at sea is that of maintaining a sufficient head of steam with an economical coal consumption. Proper draft in the uptake, over the fire and under the grates must be maintained and with the object of recording the draft at these points the instrument shown in the accompanying illustration was developed by the Precision Instrument Co., Detroit.

The gage illustrated is adapted to single furnace boilers. In the case of Scotch-type boilers, a gage having seven indicators is used. The working parts are encased in a dust proof, enameled iron case. The diaphragms that actuate the needles are German silver, carefully spun to shape. Variations of pressure are transmitted to the diaphragm through a vertical, adjustable plunger which is attached to a horizontal shaft by means of a lever which is adjustable for length.

Screw adjustments are at the side of the gage case, by which the operator may bring the pointer to zero when necessary. There are five main adjustments which enable the movement to be calibrated to accuracy at every division. The shaft is suspended in point bearings to reduce friction to a minimum. The gage is supplied with a shutoff cock which opens to the atmosphere for testing for accuracy. While the pointer is sensitive, it comes to rest at once instantly showing the pressure of vacuum.

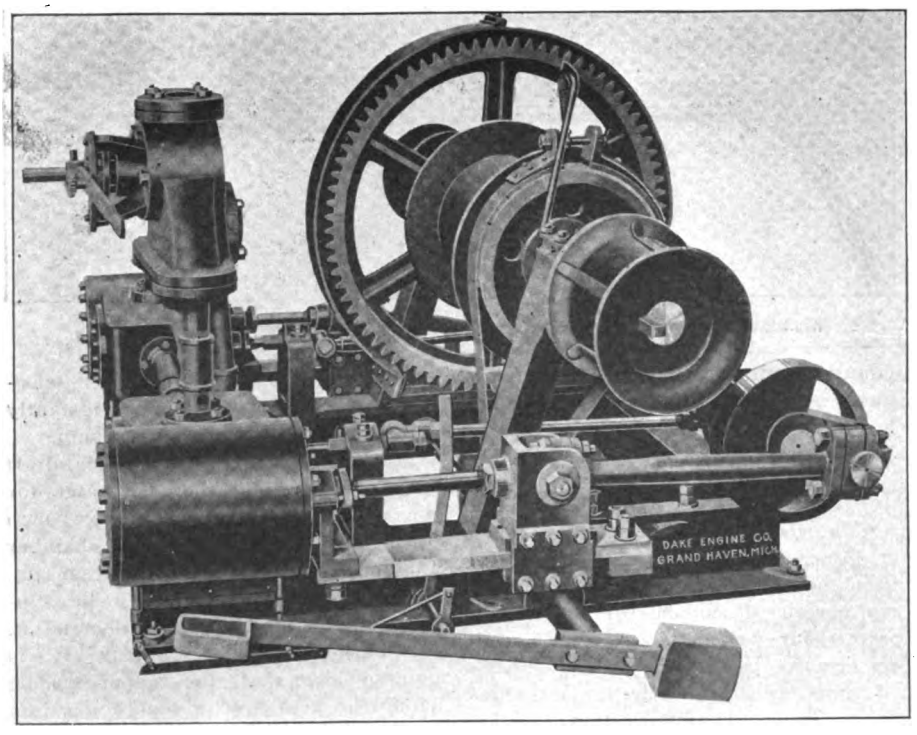
Standard readings for stoker draft are: Zero to 2 inches of water for the uptake, 1-inch vacuum to 1-inch pressure for the combustion chamber and zero to 6 inches for the ash pit. Other ranges, however, can be supplied when the conditions demand it.

In using the instrument, it is pointed out that the upper needle should be kept low to reduce gas loss in the uptake due to excess air. The center needle should be kept near zero on the draft side, for if the needle moves to the pressure side, the burning gases will be deflected downward tending to burn out the grates. On the lower gage, the needle should be kept at approximately 3½ inches. If the fire travel is dirty this cannot be done without forcing the center needle on the pressure side. If a



DEVICE FOR RECORDING DRAFT

Digitized by Google



SELF-CONTAINED, DOUBLE CYLINDER CARGO WINCH

bad hole develops in the fuel bed, the lower needle falls to zero.

The device is 20½ inches high and can be installed in any convenient place in the engine room or stokehold. It is pointed out that it serves as a ready reference by which the engineer on watch can instantly ascertain draft conditions. The gage is balanced to prevent it being affected by the motion of the ship.

Cargo Winch

The unit shown in the accompanying illustration is a cargo or ship winch developed by the Dake Engine Co., Grand Haven, Mich. It is the result of much study and is said to combine strength with simplicity. The bed frame is an I-section type and is a one-piece casting. The drum brackets are T-section shapes to insure rigidity. They carry the crankshaft bearings. Both drum and crankshaft bearings are wide in proportion, lined with babbitt. The bearing caps are machined and fitted into machined pockets.

The cylinders and valve chests are cast in one piece. By means of special tools, the cylinder and valve chest bores are machined at one operation, assuring accurate alignment. The cylinders are fastened to the bed through machined pads. The pistons, which are shrunk on the piston rods against shoulders, are provided with two packing rings each. The piston rings are ground to an accurate fit after cutting. This assures them fitting the cylinder walls snugly at all points. The valves are of the piston type, fitted with accurately ground rings to make them steam tight. The valve stems have brass bushings at the eccentric rod connections. The outer ends of the valve stems slide in babbitted brackets.

The crankshaft is cold drawn steel. The crank disks are cast iron, counterbalanced to insure smooth running. The disks are forced on to the crankshaft and further secured by means of keys. The crank pins are turned steel, so proportioned as to give a large bearing surface. They are forced into the disks and riveted over at the back end.

The connecting rods are cast steel with flanges at each end. The flanges are machined with a flat surface for bolting the wrist and crank pin bearings in place. The eccentric rods are round wrought iron, provided with right-and-left hand threads, one at each end for the purpose of adjusting the valves. The eccentric straps are cast steel, lined with babbitt metal. After casting in place, the babbitt is peined and bored to fit the eccentric. The straps are made in two pieces, machined to an accurate fit at the joints. The two halves are bolted together, several liners being interposed between the two sections for purposes of adjustment. The eccentric sheaves, or pulleys as they are sometimes termed, are cast iron, accurately machined and secured in place by keys and set screws.

The wrist and crank pin bearings are cast steel, babbitt lined. These bearings are provided with liners for taking up wear. The crosshead gibs are bronze bearing on guides of ample width to insure maximum wear. The drum shaft is cold rolled steel of large diameter to insure rigidity. The drum is cast iron, accurately balanced to insure quiet running without vibration. The face of the drum is hard chilled iron which insures maximum wear.

The drum brake, or compressor, is of the band type, made in halves, lined with hard wood blocks. Both ends are fastened to the brake band rocker which is keyed to the foot lever. A spring is attached to the band to insure ready releasing. The gears are cast iron while the pinions are cast steel. To insure safety the gears are covered with a heavy guard. The steam pipe connections to the throttle and cylinders are flanges.

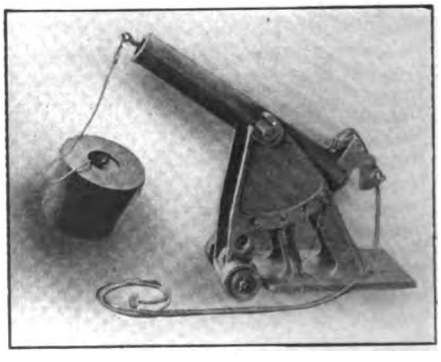
Some of the principal specifications of this winch are:

Cylinders, inches	7½ x 10
Horsepower	25
Pull on single line, pounds	4000
Line speed, feet per minute	150
Drum, inches	14 x 20
Drum shaft, diameter, inches	3½
Crankshaft, diameter, inches	3
Crankpin, inches	2⅛ x 3
Wrist pin, inches	1½ x 2¼
Piston rod, diameter, inches	1½
Valve rod, diameter, inches	1⅛
Winch heads, inches	10 x 12
Steam pipe, diameter, inches	2
Exhaust pipe, diameter, inches	2½

Line Throwing Guns

All vessels of the Emergency Fleet corporation are to be equipped with line throwing guns and outfits and at the present time contracts have been placed for 900 of these units.

Among the different types of line throwing guns being manufactured is that shown in the accompanying illustration. This is a product of the General Ordnance Co., New York, and embodies several interesting features. The carriage and gun are steel castings. The gun is designed so that it can be readily removed from the carriage for transportation about



THIS GUN IS EQUIPPED WITH A PROJECTILE CARRYING THE POWDER CHARGE

Digitized by Google

the ship and the dissembled unit permits of ready stowage. The projectile contains the firing charge, doing away with loose powder or an extra cartridge. The gun is fired by means of a lanyard which drives a firing pin into a cap exploding the charge. The gun can be set at four different elevations by means of a pin working through holes in the carriage. The line is contained in a cylindrical receptacle so that it readily uncoils as the projectile leaves the gun. The principal dimensions of the gun are:

Length of barrel, inches	32¾
Bore, inches	2½
Length of platform, inches	25½
Weight of projectile, pounds	18
Length of line, feet	1700
Weight of gun, pounds	90
Weight of carriage, pounds	200

In some recent tests, the cartridge case was immersed in water and then loaded into the gun and fired. In another test, the barrel of the gun was filled with water, the cartridge rammed home and successfully fired. These tests were made to learn if water affects the working of the apparatus during heavy weather in times when a gun of this type must prove reliable.

Portable Furnace

The device shown in the accompanying illustration is a portable furnace designed to burn kerosene for heating rivets, tools, etc., giving a quick, hot flame. It is a product of the Champion Kerosene-Burner Co., Kenton, O. The furnace is a self-contained unit with the fuel tank carried on the lower platform of the stand. These tanks are of various sizes, depending on the use to which the furnace is to be put.

PORTABLE KEROSENE BURNING FURNACE

Compressed air at 90 pounds pressure to the square inch forces the fuel to the burner. This burner is located above the hearth. The fuel is transformed into a gas just previous to being ignited. Air for driving the fuel to the burner is forced into the tank by an air pressure hose or by a pump in cases where an air line is not available. The pressure is recorded by a gage located on the top of the tank.

It is claimed that the furnace is economical as regards fuel consumption. Tests which were conducted for over a year showed that with the furnace operating to maximum capacity, the fuel consumed did not exceed ¼ gallons per hour. These tests also showed that the flame gave a heat ranging from 2500 to 3000 degrees, Fahr., burning without any traces of hydrogen. This results in a non-oxidizing flame. It is pointed out that this feature permits work to be left in the furnace for an indefinite period without danger of burning.

Business News for the Marine Trade

The Massachusetts Electric Dredge Co., Boston, recently was incorporated with $50,000 capital to build dredges, etc.

Capitalized at $2,000,000, the Intercoast Steamship Co., Boston, recently was incorporated to build and operate steamships.

The Bay State Ship Co., Boston, has been incorporated with $25,000 capital, to engage in business as a shipbuilder.

The shipping firm of Charles Kurz & Co., Drexel building, Philadelphia, has enlarged its accommodations by the addition of more office space.

The Harbor Grace Shipbuilding Co., Harbor Grace, N. F., is reported planning the erection of a shipbuilding plant.

The Teal Co., Portland, Me., has been incorporated as a shipbuilder, with $50,000 capital, by Frank I. Cowan, H. W. Baston and Clement F. Robinson.

The Dry Dock Sheet Metal Works, 140 West Forty-second street, New York, contemplates the erection of a plant, 3-stories, 25 x 100 feet.

The Walsh's Holyoke Steam Boiler Works, Holyoke, Mass., contemplates the erection of a 1-story erecting shop, to be built at an estimated cost of $10,000.

Plans are being drawn for the erection of a shipbuilding plant for the Perth Amboy Dry Dock Co., New York.

The States Steamship Corp. recently was incorporated at Wilmington, Del., to build, own and operate vessels of all kinds, with $500,000 capital.

Capitalized at $2,600,000 ,the Magellan Steamship Corp. recently was incorporated at Wilmington, Del., to build, own and operate vessels of all kinds.

The Monofer Shipbuilding Co., New York, recently was incorporated with $30,000 active capital, by J. L. Druck, L. F. Sniffin and F. Kweton, 49 Wall street, New York, to build ships of cast steel, under license of the Cast Steel Ship Corp., 114 Liberty street, New York.

An increase in its capital stock from $200,000 to $1,000,000 recently was made by the Export Shipping Corp., Wilmington, Del.

The Ship Fender Corp. recently was incorporated with $10,000 capital, by G. Stewart, W. Enderman and L. W. Wagner, 1163 Fulton avenue, New York.

The Baltimore Steamship Co., Dover, Del., recently was organized with $550,000 capital to own and operate vessels of all kinds.

Capitalized at $150,000, the Manhattan Shipyards Corp., New York, recently was incorporated by A. W. Britton, S. B. Howard and Robert K. Thistle.

Capitalized at $50,000, the Curlow Co., Portland, Me., recently was incorporated as a shipbuilder, by Frank I. Cowan, H. W. Baston and Clement F. Robinson.

The Kingfisher Co., Portland, Me., recently was incorporated as a shipbuilder, with $50,000 capital, by Frank I. Cowan, H. W. Baston and Clement F. Robinson.

The Widgeon Co., Portland, Me., recently was incorporated as a shipbuilder with $50,000 capital, by Frank I. Cowan, H. W. Baston and Clement F. Robinson.

A contract has been awarded by the Delaware Marine & Motor Co., Wilmington, Del., for the erection of a machine shop, 1-story, 59 x 200 feet, to be built at an estimated cost of $22,000.

Philip De Rondo, Frank H. Hall and Henry V Julier, New York, recently were named as the incorporators of the Orient Steamship Co., which was incorporated in Delaware with $1,750,000 capital.

The government has awarded J. A. Howland, New York, a contract to erect a 20-foot sea wall one and one-half miles long, at Sandy Hook. The wall will be 15 feet thick at the top and 50 feet across at the base.

The Stone-Richardson Corp., New York, transportation and navigation, recently was incorporated with $200,000 capital, by T. H. Ledget, L. Richardson and H. L. Stone, 70 Fifth avenue.

The Crotois Shipping Corp., New York, recently was incorporated with $50,000 capital, by B. Frankel, A. T. Sapinsky and F. H. Crotois, 570 Seventh street, Brooklyn, N. Y.

Capitalized at $500,000, the American Northern Norway & West Indies Line, Inc., recently was incorporated at Wilmington, Del., by M. C. Kelley, S. L. Mackey and J. D. Frock.

The Enterprise Boat Co., Inc., New York, transportation, recently was incorporated with $7000 capital, by M. Siegmund, R. L. Sidman and H. C. Engelberg, 701 West 178th street, New York.

The Vanada Steamship Co. recently was incorporated at Augusta, Me., to build, operate, etc., boats of all kinds for passenger and freight traffic. The company is capitalized at $500,000.

The Chilean American Steamship Co. has been incorporated in Delaware with $10,000 capital, by T. L. Croteau, H. E. Knox and S. E. Dill, of Wilmington, Del.

The Cornell-Emery Co., New York, ship repairing, recently was incorporated with $100,000 capital, by C. Emery, A. Hopkins and A. M. Wolff, 33 West Sixty-ninth street, New York.

The Maritime Stevedore Co., Brooklyn, N. Y., has been incorporated with $15,000 capital, by A. J. Clancy, C. S. Farese and A. Ggleo, 70 East Fourth street, Brooklyn, N. Y.

Matthew Hale, Washington, Charles H. Barring, and Douglas McKay, Columbia, S. C., were recently named as the incorporators of the South Atlantic

Digitized by Google

New Offices

Charles Cory & Son, Inc., New York, manufacturers of ships' electrical equipment, etc., have opened branch offices in Philadelphia at 207 Market street and in Seattle at 83 Columbia street.

The Heppenstall Forge & Knife Co., Pittsburgh, has opened an office at 704 Keith building, Syracuse, N. Y., with J. D. Weeks in charge.

Daniel H. Bender, consulting accountant and former comptroller for the United States shipping board, has opened an office at 136 South Sixteenth street, Philadelphia.

The Lidgerwood Mfg. Co., New York, manufacturer of ship winches, etc., has opened an office in the Hammond building, Detroit, with R. S. Hutchinson in charge.

The Chesapeake Iron Works, Baltimore, manufacturer of traveling cranes, has opened a branch office in the Woolworth building, New York, in charge of H. L. Mode.

Caldwell & Co. and the Caldwell Shipping Co. have opened an office in the Audubon building, New Orleans.

Laing & McKay, Philadelphia, have opened a branch office in New York at 16 William street for handling general shipping business.

The France & Canada Steamship Corp. now occupies offices at 602, 603 Bourse building, Philadelphia.

The Lidgerwood Mfg. Co., New York, manufacturer of hoists, cableways, ship winches, steering gears, etc., has opened a branch office in Detroit with R. S. Hutchinson in charge.

The Poole Engineering & Machine Co., Baltimore, has opened an office in the Engineers building, Cleveland, in charge of Frederick Baker.

Export Co., which was incorporated in Delaware with $950,000 capital.

The Interstate Park Navigation Corp., New York, has been incorporated with $5000 active capital, by S. B. Howard, G. V. Reilly and R. K. Thistle, 65 Cedar street, New York.

The Sidman Lighterage & Transportation Co. has been incorporated with $10,000 capital, by J. F. Brown, J. H. Wilkinson and R. L. Sidman, 15 Whitehall street, New York.

A. Y. Laigne and Horatio L. McKay have opened offices at 16 William street, New York, with a branch at 421 Chestnut street, Philadelphia, and will conduct a general shipping business.

Extensions proposed by the Union Shipbuilding Co., Baltimore, will cost about $8,000,000 it has been estimated. The company is said to be planning the erection of six concrete ways.

Frank I. Cowan, H. W. Baston and Clement F. Robinson were named as the incorporators of the Penguin Co., which recently was incorporated as a shipbuilder at Portland, Me. The company is capitalized at $50,000.

The Jacksonville Utility Co. recently was incorporated in Delaware to own and operate steamships, etc., by M. S. Kelly, S. L. Mackey and J. D. Frock, all of Wilmington, Del. The company is capitalized at $100,000.

Henry P. Malloy, F. X. Hennessy and Wallace Ingram, all of New York, were named as the incorporators of the Delco Steamship Co., Ltd., which was recently incorporated in Delaware with $500,000 capital.

A charter recently was granted the Peninsula Shipping Co. in the state of Delaware. The company, which is capitalized at $50,000, was chartered by F. L. Mackey, J. D. Frock of Wilmington, Del., and others.

W. F. O'Keefe, George G. Steigler and J. H. Dowdell, all of Wilmington, Del., recently were named as the incorporators of the Bethlehem Steamship Corp., which was incorporated in Delaware with $1,000,000 capital.

At a special meeting of the stockholders of the Cast Steel Ship Corp., held in New York recently, it was voted to increase the capital stock of the company from $250,000 to $600,000. The money raised by the sale of new stock will be used to extend the operations of the company.

The American Steamship Navigation Co. established to carry freight, has announced that it will go into the passenger business also. The company is said to be negotiating for two British built vessels of 9000 tons each, which are designed for passenger and cargo traffic.

The Roman Steamship Co. recently was incorporated in Delaware with $400,000 capital, by D. W. Noel, George S. Brengle and Frank H. Gerrodetta, all of New York. These men were also named as the incorporators of the Warren Steamship Co., which was also incorporated in Delaware with $400,000 capital.

Incorporated last April in New York to manufacture motors, the Zobell Electric Motor Corp. has established a plant at Garwood, N. J. The company is capitalized at $25,000. Officers are: President, Fred G. Bell; treasurer, A. T. Zoebisch and secretary, F. E. Bucker. The present equipment of the plant is designed for an output of from two to three hundred motors a month.

Capitalized at $250,000, the New York Oceanic Co., New York, recently was incorporated to engage in transportation and navigation, by J. H. Torney, G. W. Clackner and C. G. Appleton, 3750 Broadway.

The Albina Engine & Machine Works, a shipbuilding plant at Portland, Oreg., has been sold for $200,000. The plant originally cost $1,000,000. It will be dismantled.

Capt. J. H. Rinder, natuical adviser to the Pacific Mail Steamship Co. and Charles W. Cook, former chief of the traffic department of the American Hawaiian Co., have entered into a partnership under the firm name of Rinder & Cook with offices on California street, San Francisco. The firm will conduct a general business of marine surveying, brokerage and shipping.

The French-American Line, owned by Abraham Frankle and associates, has purchased a 4-story building at 62 Broad street, New York, which will be remodeled. When improvements have been completed the building will be occupied as the permanent home of the line. According to a current report in shipping circles, the line has purchased a number of steamers from the government and contemplates the ownership of a fleet of 20 large vessels.

Two large repairing contracts recently were obtained by the Baltimore Dry Docks & Ship Building Co., Baltimore. For the purpose of being reconditioned and converted from a troopship to a cargo-carrying vessel, the British steamship EURANA of the Green Star Line, is enroute to the docks of the company. The steamer BRAMMEL POINT is to be equipped with three diesel engines, replacing the present engines.

The Groton Iron Works, Groton, Conn., has received an order for six additional steel boats.

The New London Ship & Engine Co., New London, Conn., recently received a large order for internal combustion engines for commercial use. The new engines are to be twice the size of any made by this company during the war.

The United States shipping board is about to construct a drydock at Portland, Me., according to reports in marine circles.

The proposed Canadian government ownership of the Grand Trunk railway will mean that Portland, Me., will virtually become the winter port for Canada.

The Maine Fisheries Corp. is building what is said to be the largest fish freezing plant along the Atlantic coast at Boothbay Harbor, Me. The Judge Engineering Co., Boston, is handling the construction.

The copartnership between Philip Cohen and Max Torbin, known as the Savoy Importing Co., Boston, has been dissolved.

The Albina Engine & Machine Works, a shipbuilding plant at Portland, Oreg., has been sold for about $220,000, according to a recent announcement. The original cost of the plant is said to have been $1,000,000. It is understood the plant will be dismantled. President William Cornfoot will operate a marine repair plant at Portland.

Extensive new terminals in Seattle harbor are planned by Frank Waterhouse & Co., one of the most active shipping firms at that port. Mr. Waterhouse purchased the site on the West waterway some some ago and has just had plans drawn for the improvement. A pier and transit shed 900 feet in length and 150 feet wide are included, back of which there will be a reinforced concrete warehouse of the same dimensions. The site lies on deep water and is considered ideal for a modern terminal.

New Trade Publications

RECORD REPAIR JOB.—The Todd Shipyards Corp., New York, recently issued a booklet describing repairs to the steamer LORD DUFFERIN, which was rammed by the AQUITANIA last February. The booklet contains 26 illustrations showing how the big repair job progressed. Repairs to this vessel were described in THE MARINE REVIEW for October.

MARINE FITTINGS.—The Thacher Propeller & Foundry Corp., Albany, N. Y., is issuing an illustrated catalog devoted to its marine fittings. Over 50 items are given including anchors, grapnels, cleats, chocks, mooring posts, bitts, snubbing posts, mooring rings, capstans, deck scuttles, ventilators, fair-leaders, hawse reels, hawse pipes, water-deck irons, air-deck irons, spud points, propellers and grates.

DROP FORGE TOOLS.—A 160-page illustrated catalog describing drop forgings and drop-forged tools is being issued by J. H. Williams & Co., Brooklyn, N. Y. The tools described include turning-tool holders, set-screw pattern boring-tool posts, forged-cutter tool holders and several assortments of drop-forged wrenches. The book also contains a description of the drop-forging process in simple, non-technical language for the benefit of those not conversant with its details.

VALVES.—A catalog describing valves used aboard ships is being issued by the Schutte & Koerting Co., Philadelphia. Among the valves illustrated and described are: Stop, stop check, check, triple-duty, and extra heavy flanged valves. Several illustrations are in half sections showing the interior arrangement of the valves while reproductions of line drawings are included which give the principal dimensions. The company also is issuing another booklet describing how its products were used during the war.

CONTRACTORS' EQUIPMENT.—The Dake Engine Co., Grand Haven, Mich., recently issued a 64-page catalog describing contractors' equipment, steam motors, air motors, pneumatic hoists, marine machinery, etc. The catalog is profusely illustrated and contains complete descriptions of the various devices listed. One of the units featured is a square-piston engine which is said to be an advantageous prime mover in cases where the motion to be converted is in one direction only. It is pointed out that these engines take up but little space and that they can be operated by semiskilled labor for long periods without attention.

STOCKLESS ANCHORS.—A bulletin describing cast steel stockless anchors recently was issued by the Penn Seaboard Steel Corp., Philadelphia. It is pointed out that the anchors comprise but five parts, all made of acid open-hearth steel, with a tensile strength of 60,000 to 70,000 pounds to the square inch. It is said that the design of these anchors insures good gripping power and that they house close to the vessel's sides in the hawse pipes. These anchors have been approved by the American Bureau of Shipping, Bureau Veritas and Lloyd's Register of Shipping.

Digitized by Google

7.05
A
Commerce
NOV 21 1919

THE MARINE REVIEW

blished Monthly
l. 49, No. 12

CLEVELAND DECEMBER, 1919 NEW YORK

Entered as second class matter, March 26, 1909, at the post office at Cleveland, Ohio, under the act of March 3, 1879

20 Cents a Copy
$2.00 a Year

All that its name implies

"A Boiler Cleaner"

DIACK & SMITH
Chemical Engineers
49 West Larned St.
DETROIT, MICHIGAN

September 30,1919.

Mr George Purvis,
Geyser Boiler Appliance Co.,
Detroit, Mich.

Dear sir:-
Herewith the analysis of the sample of Boiler sediment submitted on the 26th.

Dry sample.

Loss on ignition.	17.75%
Silica. (SiO_2)	8.78%
Iron and Aluminum oxides.	5.80%
Calcium oxide. (CaO)	35.58%
Magnesium oxide.(MgO)	9.90%
Sulphur trioxide.(SO_3)	1.49%

The composition of the sediment from the above analysis is calculated to the following.

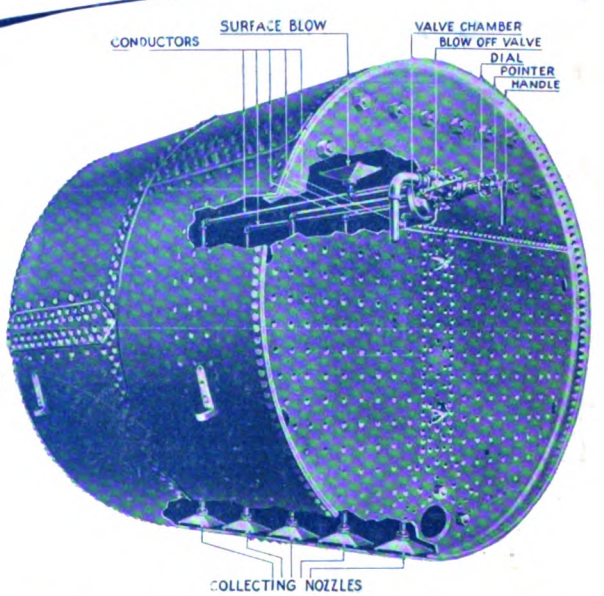
Calcium Sulphate. ($CaSO_4$)	8.65%
Calcium Carbonate. ($CaCO_3$)	61.68%
Magnesium Carbonate. ($MgCO_3$)	20.79%
Iron and Aluminum oxides.	5.80%
Silica. or SiO_2.	8.78%
Organic matter and loss.	.42%

This material is scale forming,in fact corresponds closely to boiler scales that we have analysed in the past.

Yours very truly,

Analysis of sediment from boiler of Steamer Alpena obtained Sept. 20, 1919

Blow off valve wide open for usual period in drawing each sample



Amount of sediment obtained from Purifier on Steamer Alpena, September 20, 1919.

Amount of sediment obtained from Geyser Boiler Cleaner on Steamer Alpena, September 20, 1919.

THE GEYSER BOILER CLEANER

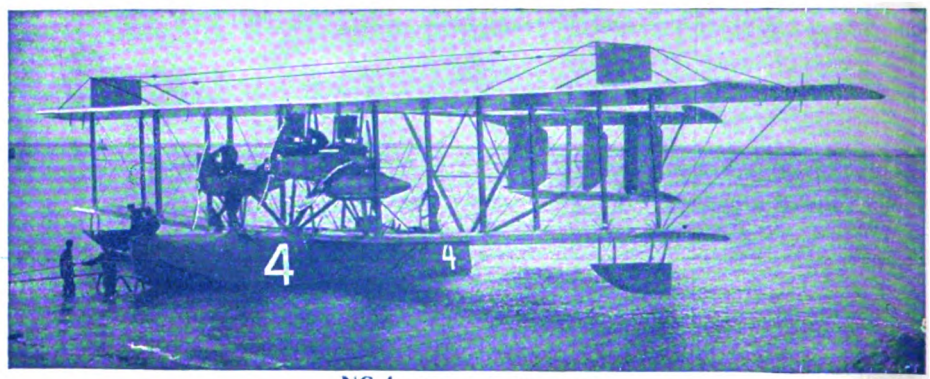
Mfd. by Geyser Boiler Appliance Co., 661-663 Atwater St., Detroit, Mich.

Alphabetical List of Advertisers, page 176 Contents, page 5 'Where to Buy," page 160 Classified Advertisements, page 174-175

Digitized by Google

HATS OFF TO THE NAVY

Medal and Diploma received at World's Columbian Exposition, Chicago, 1893



NC-4 ELECTROSE EQUIPPED © E. L., N. Y.

Medal and Diploma received at World's Fair, St. Louis, 1904

ELECTROSE INSULATORS—
FIRST TO CROSS OCEAN IN THE AIR

"By courier, coach and sail-boat, it took days for the news of Waterloo to reach London. During Lieut. Commander Read's flight to Halifax Assistant Secretary Roosevelt in Washington sent a radio message to NC-4, of whose position in air he had no knowledge. In three minutes he had a reply."—*Extract from New York World, June 3, 1919.*

INSULATION "Made in America" ELECTROSE INSULATION "Made in America"

Louis Steinberger's Patents

Standard of the World for High Frequency Currents Used by UNITED STATES NAVY and ARMY, and the Wireless Telegraph and Telephone Companies.

SOLE MANUFACTURERS

ELECTROSE MFG. CO. 66-82 Washington St. 66-76 Front St. 27-37 York St. 1-23 Flint St. Brooklyn, N.Y., America

PNEUMATIC Thor TOOLS

When you want to put across a job at high speed and low labor cost, the surest way is to connect up to Thor Pneumatic Tools. They're "speed merchants" thru and thru and the expense for operating them wouldn't even amount to enough to drop on the church collection plate.

Tell us the nature of your work and we will select the most efficient tool for the job.

Write for Catalog

Thor Pneumatic Drill. Pressed Vanadium Steel pistons and connecting rods. Corliss Valves—Roller Bearings.

INDEPENDENT PNEUMATIC TOOL COMPANY

CHICAGO NEW YORK PITTSBURGH DETROIT CLEVELAND SAN FRANCISCO BIRMINGHAM MONTREAL TORONTO

Digitized by Google

An exact reproduction, of the compass record of R. M. S. Bergensfjord. Note how she was steaming on course 248° until 10:05 P. M. (the second dark circle). Then see how she suddenly altered her course to 158° Seven minutes later, she was back on her original course.
SPERRY
GYROSCOPE CO.

She turned— and the compass wrote it down

AT ten o'clock on the evening of July 29th, the R. M. S. Bergensfjord received an S.O.S. from a burning tanker. She altered her course until a second message told her that the fire was under control.

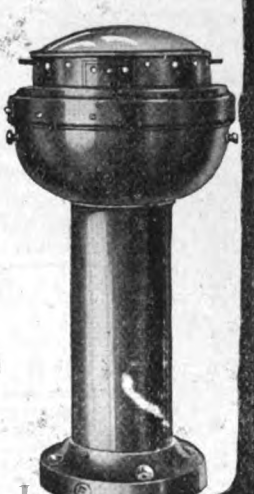
Not a matter of any importance, to be sure—just an incident in the voyage. But suppose conditions had been different. Suppose the ship had been lost and that it had been necessary to prove before a Court of Inquiry that the Bergensfjord had gone to her aid.

Indisputable evidence would have been in the hands of the Bergensfjord's Captain, for as the ship turned, her Sperry Gyro Compass recorded the fact, showing the exact true course on which she was steaming, the time her course was altered, and the new course she steered on.

THIS compass record is evidence that cannot be faked—evidence that leaves no room for "opinions" or guesswork. It shows every change in the heading of the ship.

The Sperry Gyro-Compass is the only compass with which it is possible to record the courses of a ship. But that is not all—it is the only compass that always points True North and is always free from magnetic variations and deviations.

Just off the press—a well illustrated book, fully describing the Sperry Gyro-Compass will be sent free to officers of the merchant marine. Write for it.



THE SPERRY GYROSCOPE COMPANY

Manhattan Bridge Plaza Brooklyn, New York

Great Lakes Sales and Service Office, Guardian Building, Cleveland, Ohio

Digitized by Google

Oxweld

EVERY last shipyard in America uses oxy-acetylene blowpipes—freely says that they are indispensable—in quantity production of ships.

Burners and welders like the Oxweld Injector Blowpipe because it is fast, sturdy, and dependable. Its perfect balance and easy control invariably win the operator.

No need to emphasize the value of the Oxweld Cutting Blowpipe—it's a recognized necessity. But—

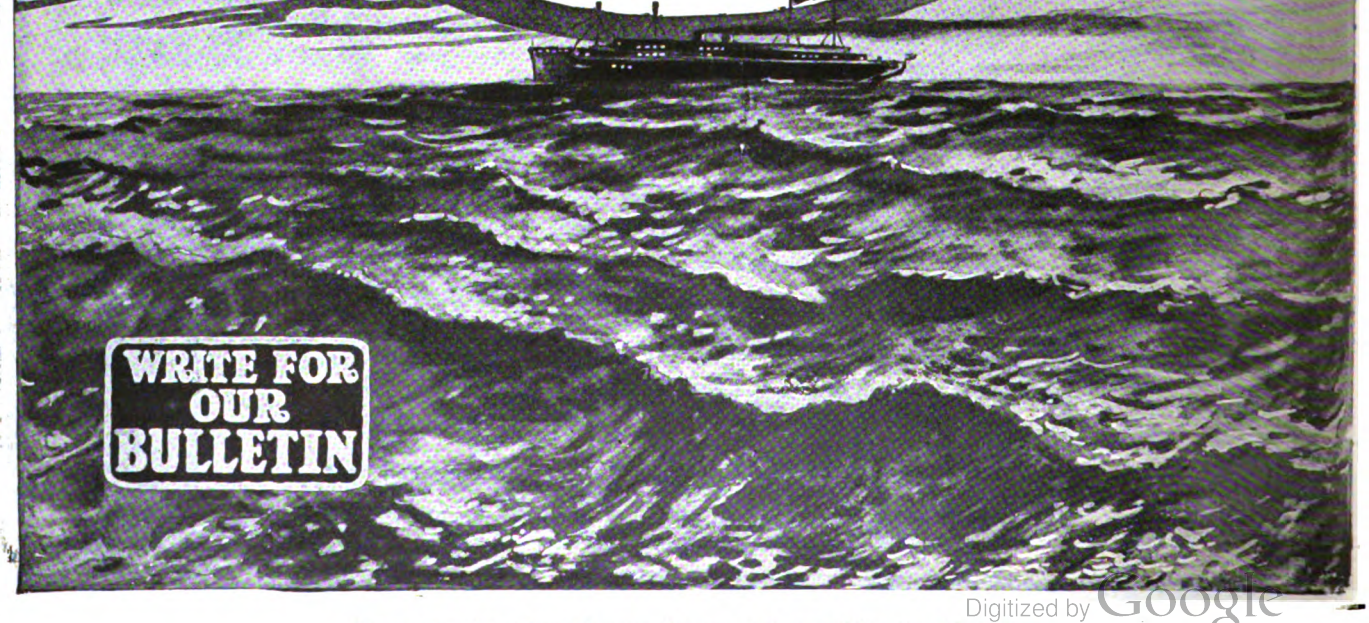
If all yards followed the American Bureau of Shipping's list of parts that may be oxwelded, production costs would quickly drop. You'd better write for that list.

OXWELD ACETYLENE COMPANY

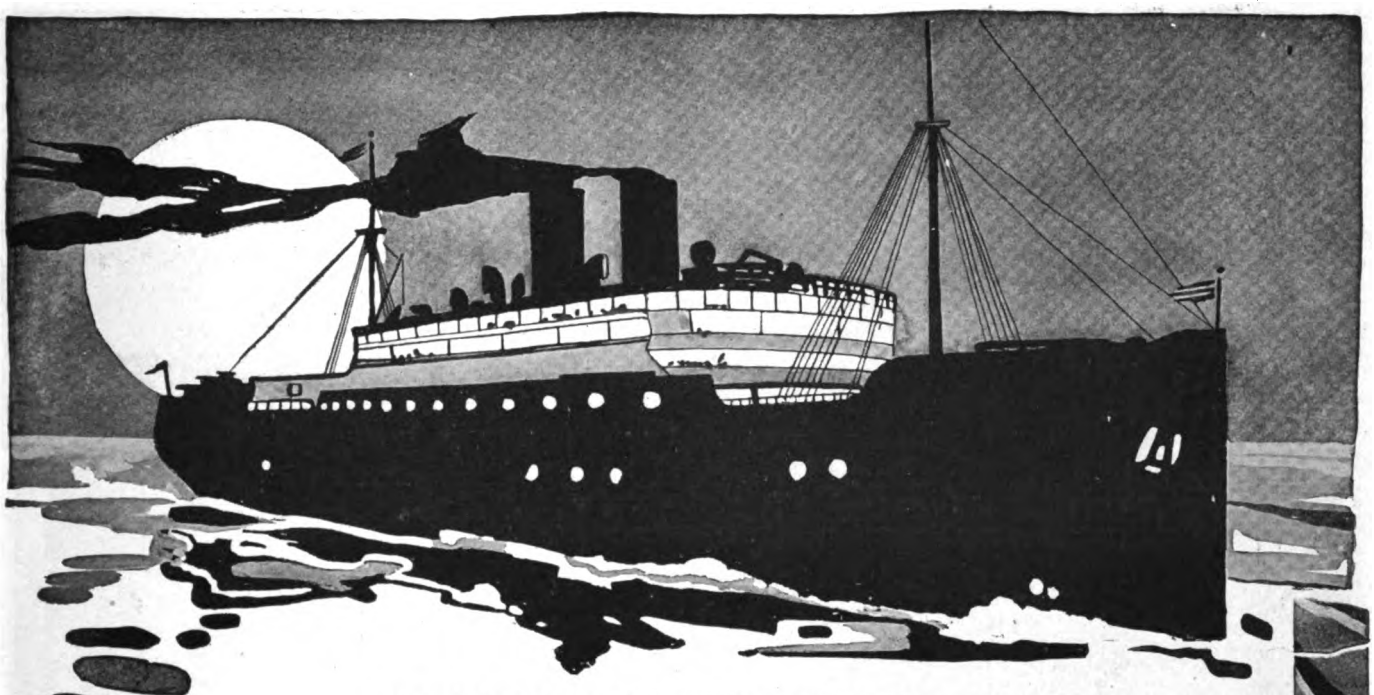
NEWARK, N. J. CHICAGO LOS ANGELES

World's Largest Maker of Equipment for Oxwelding and Cutting Metals

174



Digitized by Google



CLEVELAND—NEW YORK, DECEMBER, 1919

THE MARINE REVIEW

A Monthly Publication Devoted to Shipbuilding, Marine Engineering and the Business of Transportation by Water.

Published by the Penton Publishing Co., Cleveland, Ohio, U. S. A.

IN THIS ISSUE

	PAGE		PAGE
Shipping Bills Flood Congress	563	Statistics of the Lake Trade	583
World Charter Market	564	Latest Marine News in Pictures	584
New Design for Coal Loading Pier	567	How to Determine Shipyard Costs	586
New European Service of THE MARINE REVIEW	570	Marine News in a Personal Way	590
How Modern Ships are Paid—I	571	Practical Crane Installations	592
France Now Building Many Ships	574	Bits from the Log of Progress	594
Log of the PRUSA	575	Practical Ideas for the Engineer	596
Problems of the Vessel Operator	578	Activities in the Marine Field	600
New Ship Bills Before Congress	579	Equipment Used Afloat, Ashore	604
Condensed Reviews of Latest Books	581	Business News for the Marine Trade	607
Late Decisions in Maritime Law	582	New Trade Publications	608

BRANCH OFFICES

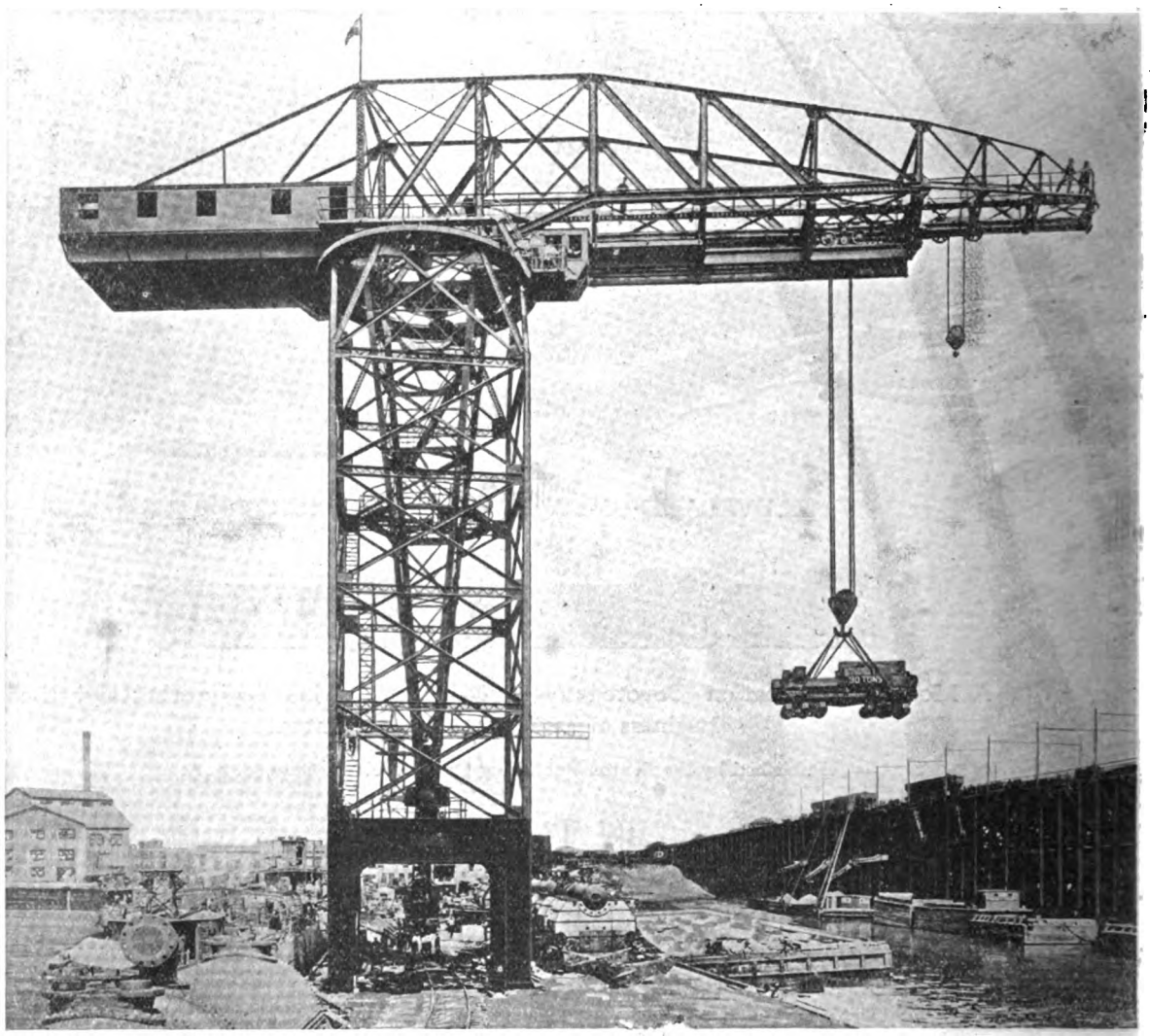
BOSTON	426 Old South Bldg.	WASHINGTON	40 Metzerott Bldg.
CHICAGO	1147 Peoples Gas Bldg.	BIRMINGHAM, Eng.	Prince's Chambers
CINCINNATI	York Street and Western Ave.	LONDON, Eng.	16 Regent St., S. W. 1.
NEW YORK	220 Broadway	MANCHESTER, Eng.	10 Norfolk St.
PITTSBURGH	2148-49 Oliver Bldg.		

Subscription $2.00 per year postpaid, all over the world. Single copies 20 cents. Back numbers over three months 50 cents. The Cleveland News Co. will supply the trade with THE MARINE REVIEW through the regular channels of the American News Co. European Agents, The International News Co., Breams building, Chancery Lane, London, E. C., England.

Member, the Audit Bureau of Circulation and Associated Business Papers, Inc.
Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.
(Copyright 1919 by the Penton Publishing Co.)

Digitized by Google

THE WELLMAN-SEAVER-MORGAN COMPANY, CLEVELAND, OHIO



W-S-M Shipyard Fitting Out Crane

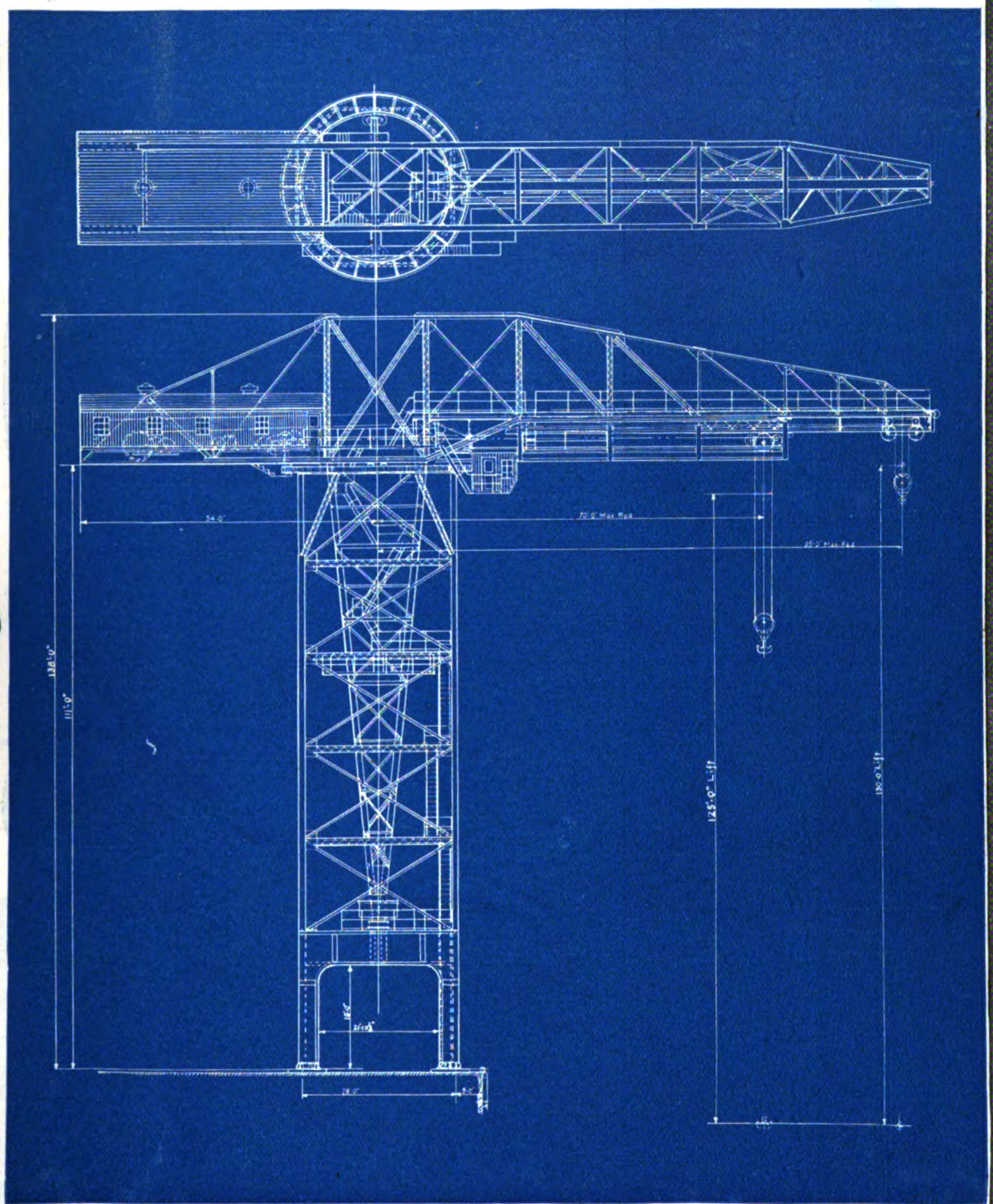
This 75 ton electrically operated stationary hammerhead revolving fitting-out crane is shown under test load at the shipyard of The Wm. Cramp & Sons Ship and Engine Building Company.

It has a rated capacity for hoisting and slewing a load of 75 tons at a maximum radius of 70 ft. from the center of the tower and 10 tons at a maximum radius of 95 ft. from the center of the tower.

The test load, as indicated in the photograph, was 90 tons at a radius of 70 ft. from the center of the tower or 20% in excess of the specified load.

Digitized by Google

THE WELLMAN-SEAVER-MORGAN COMPANY, CLEVELAND, OHIO



The wide range of operation of this crane and the facility with which it handles materials make it desirable for all ship yards.

Digitized by Google

Westinghouse

Bringing Fuel Costs Down—

Before the war the Matson line operated two 15,000-ton passenger liners, the S. S. Matsonia and the S. S. Maui, between San Francisco and Honolulu.

With the exception that the Matsonia has reciprocating engines and a single screw, while the Maui has Westinghouse Geared Turbines and twin screws, these ships are otherwise alike.

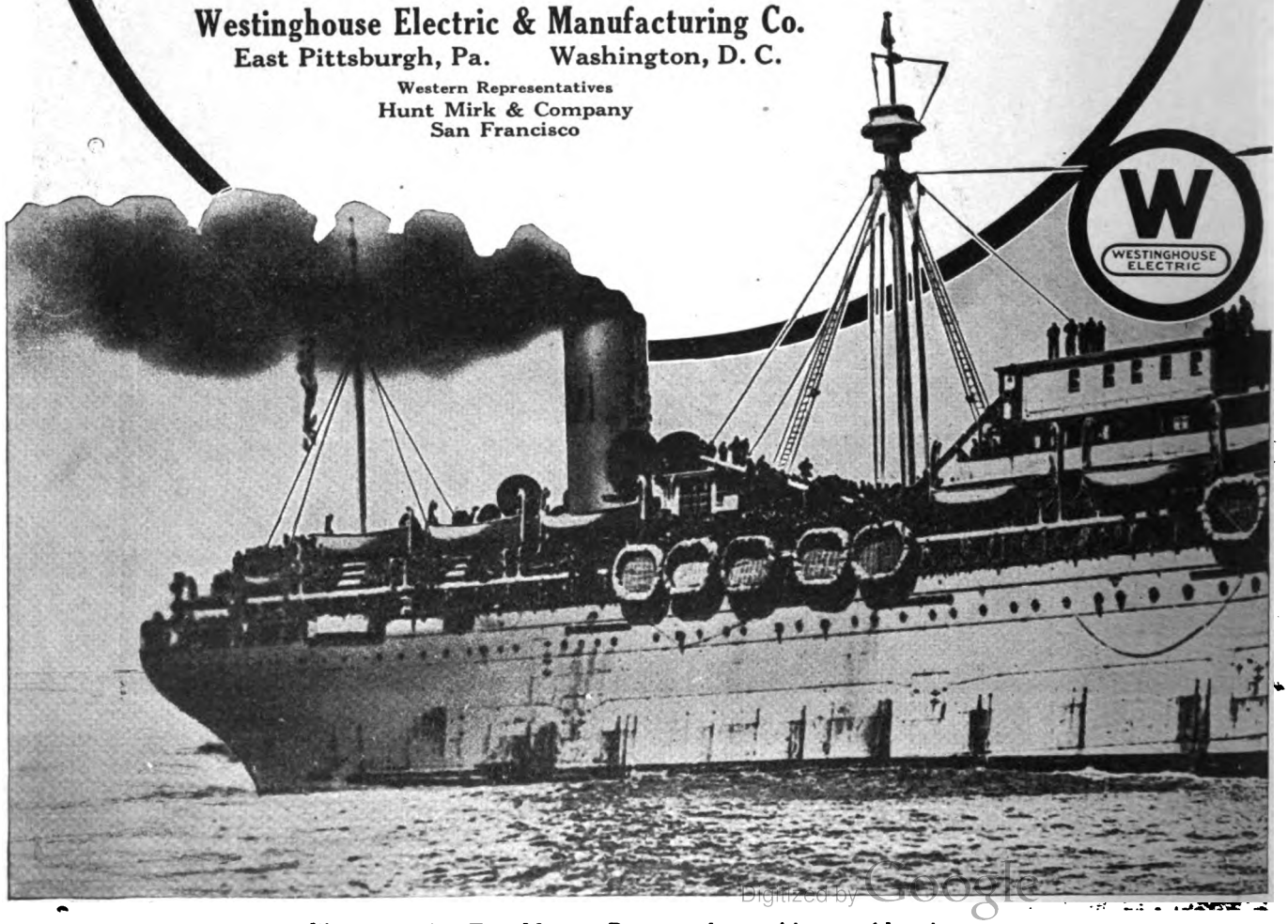
A careful record of the fuel oil consumption (sea steaming only) was kept on both ships for five voyages while both were in the same service and subjected to the same weather conditions, the difference in average voyage displacement being only eight tons. The result was a saving in favor of the Maui of 23%.

The general tendency toward turbine drive is indicated by the fact that within the past two years, 100 ships have been equipped with Westinghouse propulsion machinery.

Turbine drive affords not only a material reduction in fuel costs, but also a deduction in weight of equipment, more cargo-carrying space and a marked reduction in maintenance expense.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa. Washington, D. C.

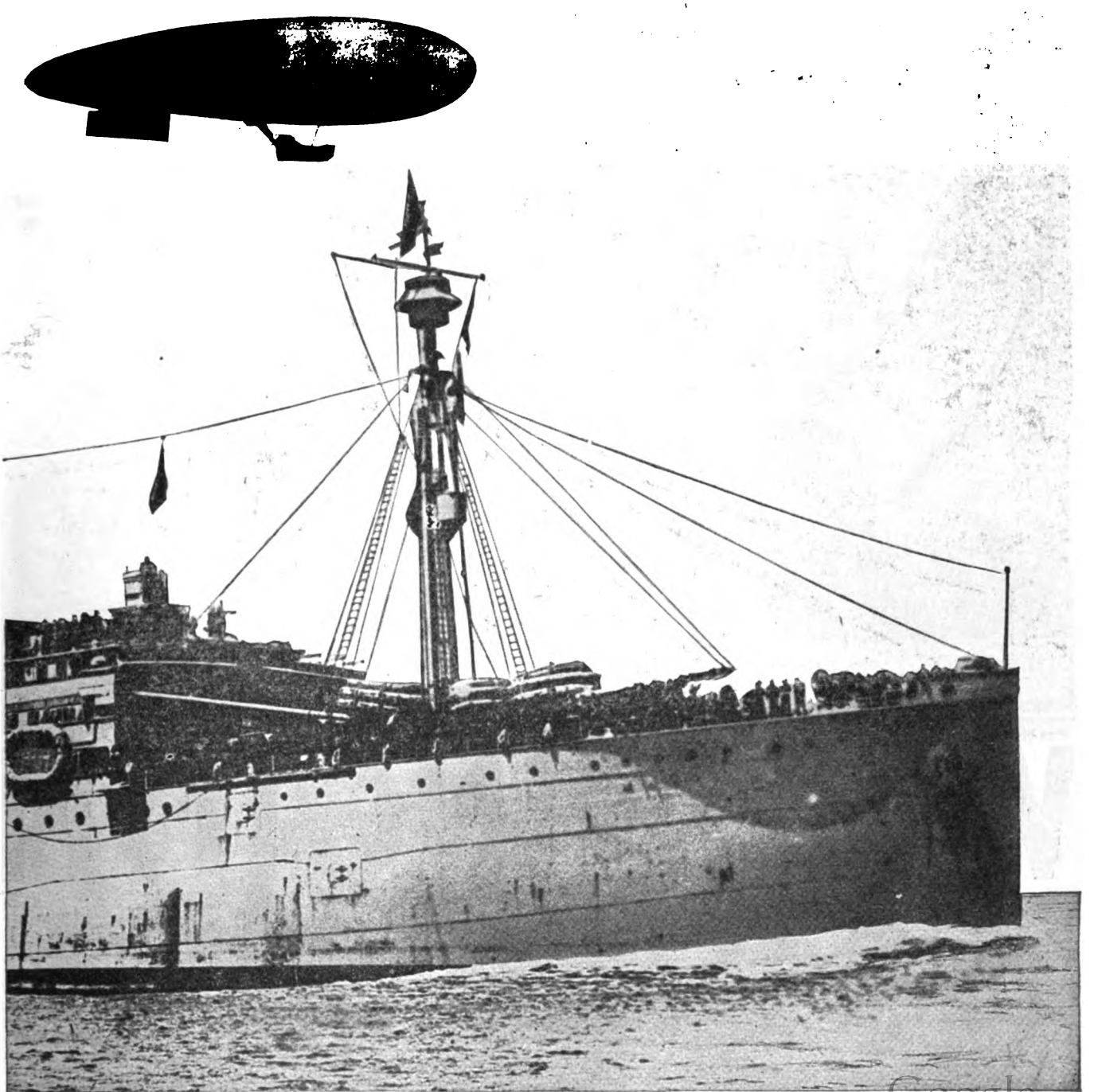
Western Representatives
Hunt Mirk & Company
San Francisco



Digitized by Google

Marine Equipment

U.S.S MAUI



Digitized by Google

PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—

From Photo © Brown Bros., New York City

WORTHINGTON

Worthington Works
Harrison, N. J.
Blake & Knowles Works
East Cambridge, Mass.
Deane Works
Holyoke, Mass.
Hazleton Works
Hazleton, Pa.

Digitized by Google

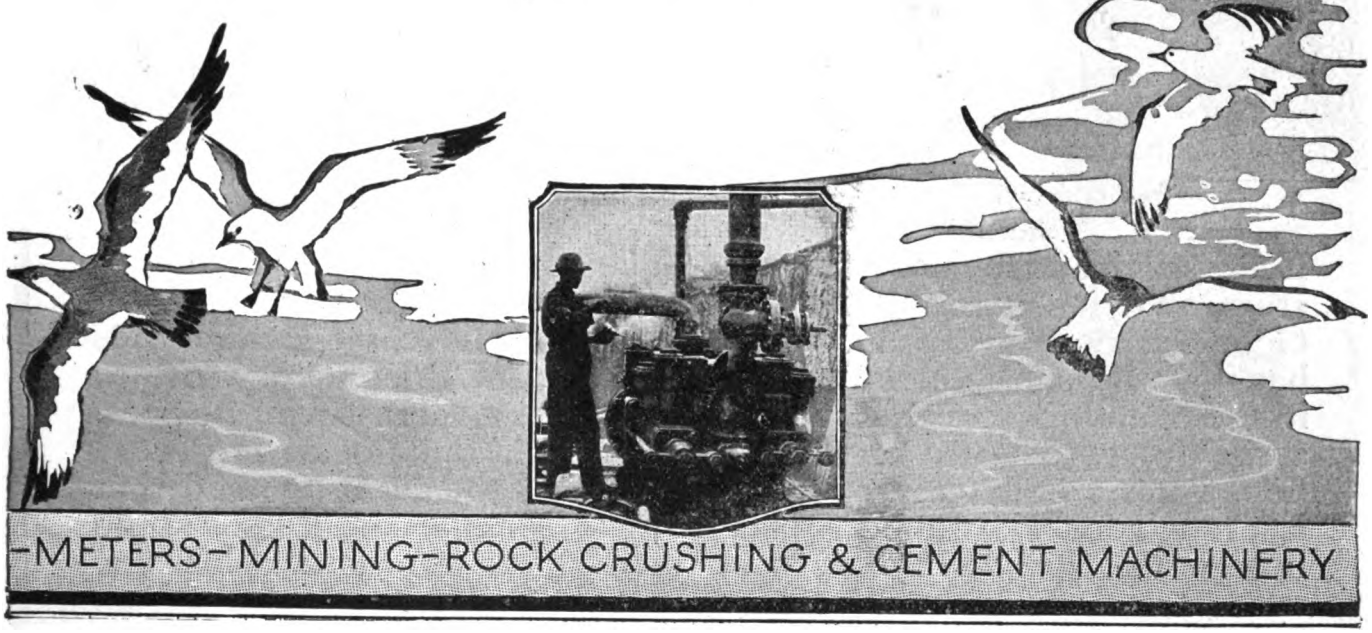
Sunk with the Maine, this pump helped to raise her

FOURTEEN years at the bottom of the sea—and still a good pump. That is the record of a Worthington Pump (made in our Blake & Knowles Plant) which went down in 1898 with the Maine. Several years ago, when the famous old battleship was raised, this pump with but two new parts—a piston rod and a valve rod—was connected up and assisted in unwatering the vessel.

That the Navy did not need this evidence of endurance and stamina, however, has been amply proven by the fact that most of the vessels of the American Navy are now equipped with Worthington pumps.

The ability of Worthington to meet the exacting demands of the naval engineers is but another reason why the name Worthington is usually found in well-planned industrial plants.

WORTHINGTON PUMP AND MACHINERY CORPORATION
Executive Offices: 115 Broadway, New York City
Branch Offices in 24 Large Cities

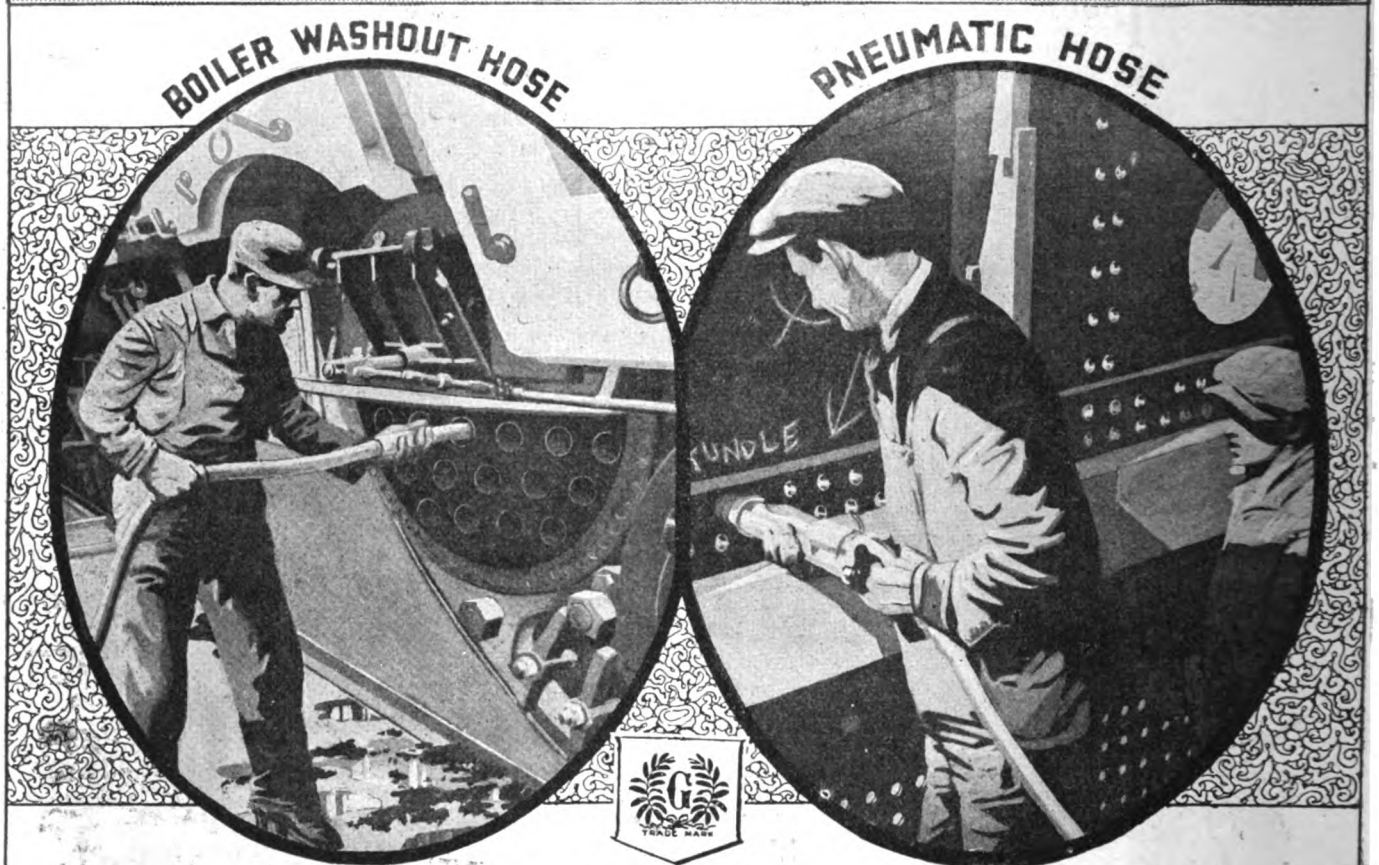


WORTHINGTON

Snow-Holly Works
Buffalo, N. Y.
Laidlaw Works
Cincinnati, Ohio
Power & Mining Works
Cudahy, Wis.
Gas Engine Works
Cudahy, Wis.

Digitized by Google

GOODRICH HOSE

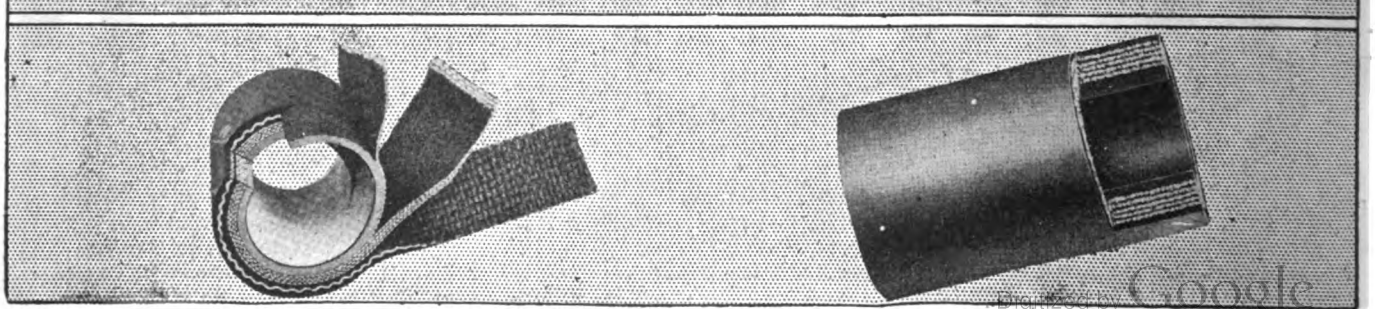


Every service on the Boiler means stamina with a big "S"—and Goodrich Boiler Washout Hose has it. The special tube keeps its life in all temperatures. Pressures are taken care of by the heavy fabric body, and over all is a tough cover of rubber. This hose is fine for Rotary Cleaner work, too.

The war made air-driven tools as common as blackberries, and Goodrich have made hundreds of miles of Pneumatic Hose to drive these labor-saving devices. Goodrich Pneumatic Hose delivers all the air at one end that came from the compressor at the other end. No kinks. No leaks. Goodrich Quality is the reason.

THE B. F. GOODRICH RUBBER COMPANY
The City of Goodrich—AKRON, OHIO

USED WHERE THE HARD WORK IS



Digitized by Google

Dredge and Drill-Boat Equipment

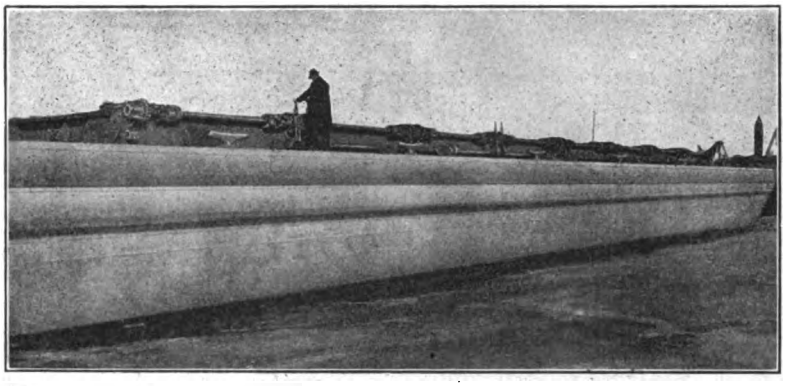
"SUPERIOR" Steam Winding Gear

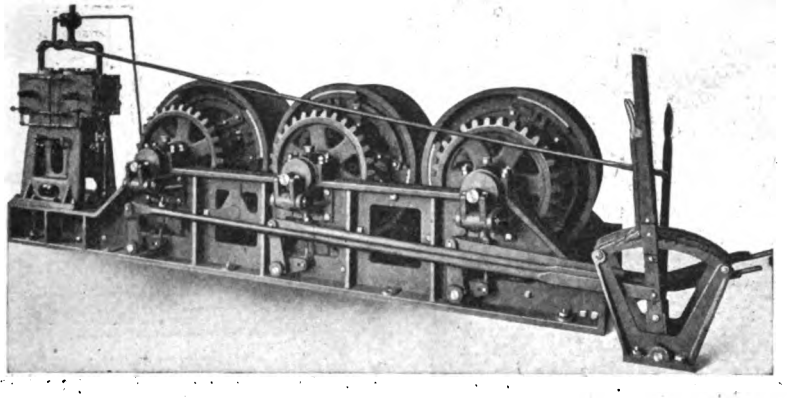
No. 544 Patented

For Dump Scows

This gear winds the largest scow in a few minutes.

Only one man is required for the entire operation.





"SUPERIOR" Dredge Deck Engine

No. 587 Patented

For Handling Dump Scows

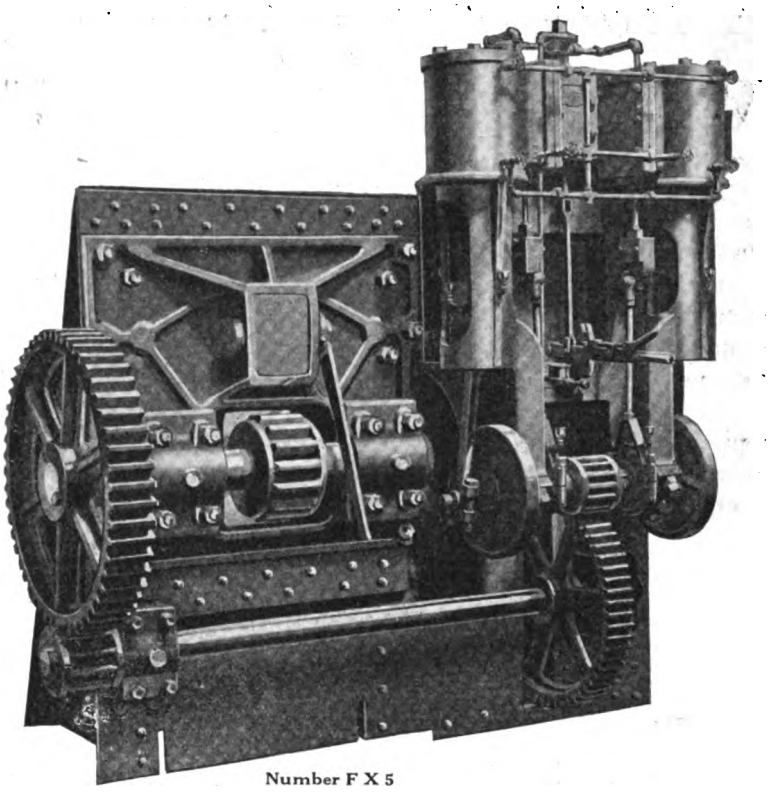
Each Drum may be operated independently and is fitted with a brake.

"SUPERIOR" Anchor Hoist for Dredge and Drill-Boat Anchors

Of sturdy construction, equipped with structural steel housing and secure fastenings. May be used without housing if desired.

These three machines have been in use for over ten years by the U. S. Government, the Great Lakes Dredge and Dock Co., and other large operators.

Just tell us you are interested



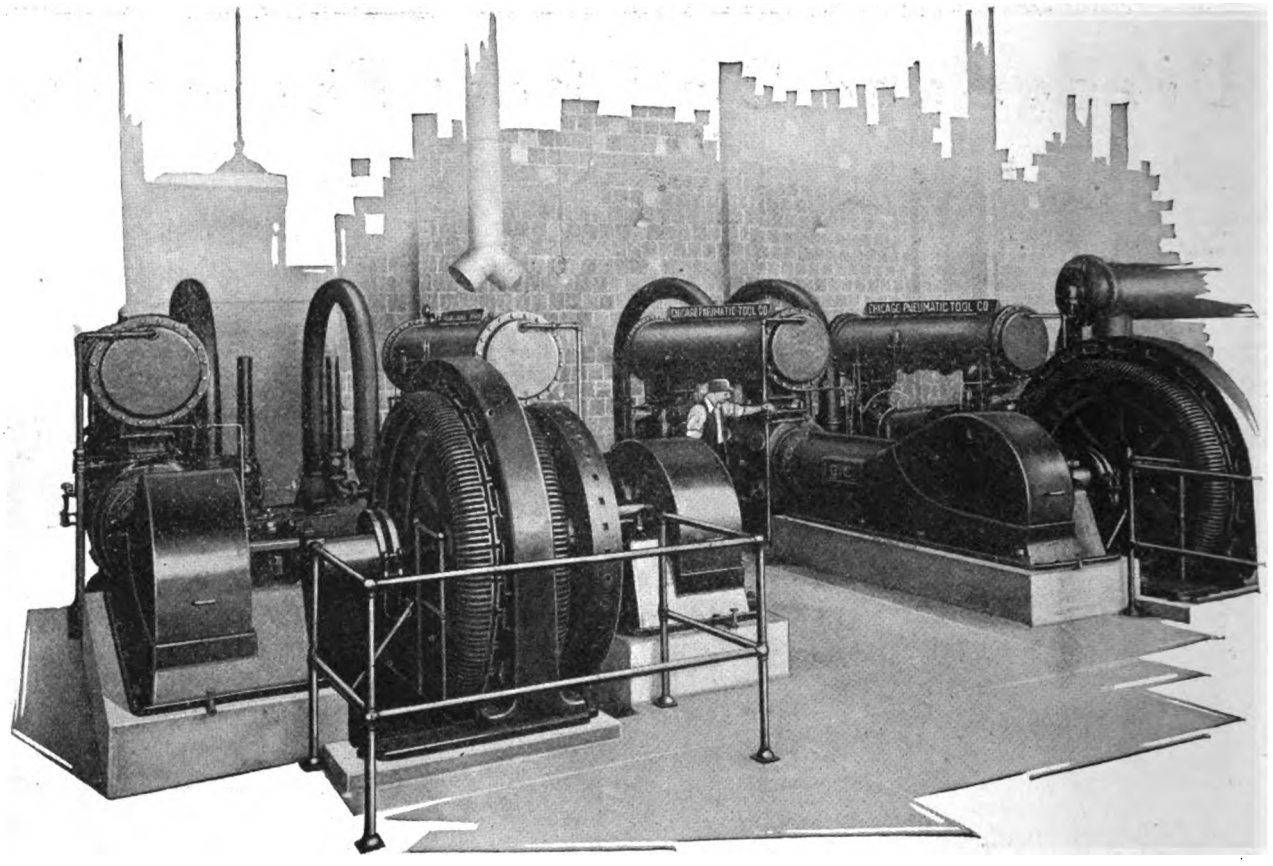
Number F X 5

SUPERIOR IRON WORKS CO.

Superior, Wisconsin

Designers and Builders of "SUPERIOR" Engines and Machinery

Digitized by Google



A return from investment that shows each month

WHEN each month's power costs are checked against cubic feet of air compressed, "Chicago Pneumatic" Air Compressors are shown to have made a substantial return of investment, for this very simple reason — Every "Chicago Pneumatic" is provided with *automatic regulation* by means of which the power is varied to correspond with changing load demands. When those demands are light, down goes the power consumption; result —no waste of power, conservation of fuel energy—minimum power-cost per cubic feet of air compressed.

The Class O-CTDE "Chicago Pneumatics" pictured above, are installed at the Chester, Pa., plant of the Chester Shipbuilding Corporation. "Chicago Pneumatics" are built in over three hundred sizes and types, all modern in every detail.

THAT saving will be effected the very first month you operate a "Chicago Pneumatic"—and every month thereafter, throughout a long service life.

Important as this may seem, it is but one of the distinctive features—among them "Simplate" Indestructible Flat Disc Valves, which are resulting in consistently efficient operation at low maintenance cost by "Chicago Pneumatic" Air Compressors, in all kinds of service throughout the world.

Chicago Pneumatic Tool Company, 1097 Fisher Building, Chicago

Sales and Service Branches all over the World

Birmingham Boston Buffalo Cincinnati Cleveland Detroit Eldorado El Paso Erie Joplin Los Angeles Milwaukee Minneapolis New York Philadelphia Pittsburgh Portland Richmond Salt Lake City San Francisco Seattle St. Louis Tucson Bombay Brussels Frankfurt Havana Honolulu Johannesburg Christiania London Milan Montreal Omaha Paris Seoul Sydney Tokyo Toronto Vancouver Winnipeg

C-33

BOYER PNEUMATIC HAMMERS · · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · GIANT FUEL-OIL, GAS, GASOLINE AND STEAM ENGINES ROCK DRILLS · · · COAL DRILLS

CHICAGO PNEUMATIC

Depend upon that Name

Digitized by Google

Shipyard Air Tool Service

has its beginning in supplying you with air tools of the highest quality and of just the right size. **Little David** tools are sturdy, powerful and simple in design, easy to operate and maintain. They are built in a wide range of sizes and styles to meet your requirements in the most economical way.

But our interest in your equipment does not cease when the tools are delivered. The services of a pneumatic tool expert are at your call, and a nearby warehouse will promptly supply your wants in tools, parts or fittings.

Little David is not only the name of a superior line of pneumatic tools; it is the name of a service as well. We will be glad to send you promptly our catalog describing the tools.

Ask for Catalog 8000.

INGERSOLL-RAND COMPANY

GENERAL OFFICES, 11 BROADWAY, NEW YORK

DOMESTIC OFFICES

BUTTE, JUNEAU, DULUTH, DENVER, BOSTON, EL PASO, SEATTLE, ST. LOUIS, CHICAGO, NEW YORK, KNOXVILLE, SCRANTON, HOUGHTON, CLEVELAND, PITTSBURGH, BIRMINGHAM, LOS ANGELES, DETROIT, NEW ORLEANS, PHILADELPHIA, SAN FRANCISCO, SALT LAKE CITY, JOPLIN

FOREIGN OFFICES

LONDON, PARIS, MADRID, MILAN, RIO DE JANEIRO, MONTREAL, MEXICO CITY, MELBOURNE, KALGOORLIE, JOHANNESBURG, SANTIAGO, CHILE, LIMA, PERU, KOBE, JAPAN, MANILA, TOKIO, HONOLULU, HAVANA, BUENOS AIRES, ANTOFAGASTA, LA PAZ, BOLIVIA, VANCOUVER, B. C.

APPLY TO NEAREST OFFICE

135-PT

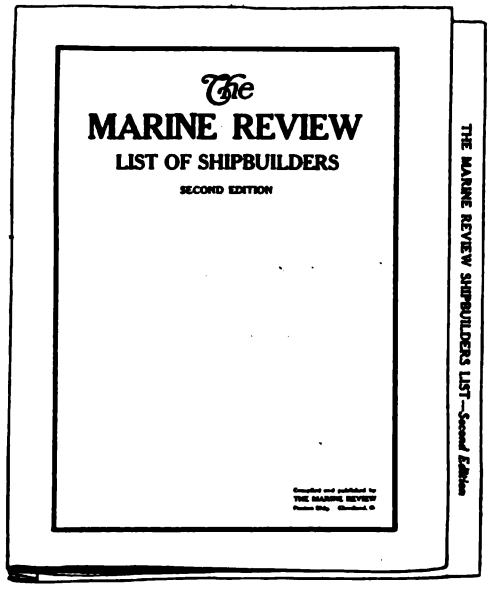
Digitized by Google

It Proved Its Worth—
Now A Second Edition

The Marine Review's Shipbuilders List

Corrected to October 1, 1919

Many changes have necessarily occurred in the shipbuilding industry on account of the sudden shift from a war to a peace time basis.



The Second Edition Shows—

Yards actually in business.

Names of important officers of company.

Name of purchasing agent.

Kind of vessels built.

Every worth-while shipbuilder in U. S. and Canada.

"MARINE REVIEW SERVICE" WILL KEEP THE LIST UP-TO-DATE

Supplementary sheets will be sent gratis to holders of second edition, and these will contain additions, subtractions and changes in address and personnel.

Loose leaf form, can be separated for quick addressing. Convenient for filing, 9½ x 11, fits standard desk or vertical file.

ORDER BLANK

THE MARINE REVIEW
Penton Building, Cleveland, Ohio.

Enclosed is $.....Please send.....copies Second Edition, Marine Review's Shipbuilders List at $5.00, post paid.

Name.....

Address.....

City.....

While in Print

$5.00

Use the attached blank and get your copy.

Published by
THE MARINE REVIEW
CLEVELAND, OHIO

The national business paper of the marine field.

Google

THE NEW AIRCO WELDING TORCH

The latest word in torch manufacture. A strong, perfectly balanced tool which will not leak or backfire. Simply constructed. Economical in operation. Adapted to a wide range of use.

Send for printed description of this splendid new apparatus.

Valve handles easy to turn.
Hose connections in straight line.
Valve body and butt of handle cast in one piece to eliminate gas leakage.
Welding table stamped on handle.
Handle is knurled to afford a firm grip.
AIRCO MODEL A WELDING TORCH
Head drop-forged.
Acetylene grooves accessible.
Metal to Metal Seat, forming gas tight joint.
Single inlet for mixed gases.
Tip held tightly in place by tip nut.
Tip of special alloy.

OTHER AIRCO PRODUCTS

Oxygen Acetylene

Welding and Cutting Apparatus and Supplies.
Nitrogen Carbide
Acetylene Generators

AIR REDUCTION COMPANY, Inc.

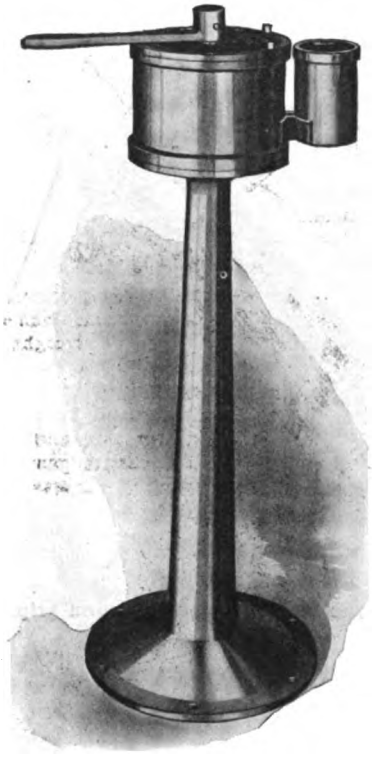
120 BROADWAY, NEW YORK CITY

AIRCO OXYGEN SERVICE

ACCESSIBILITY OF SERVICE STATIONS, FLEETS OF MOTOR TRUCKS AND ABUNDANCE OF CYLINDERS INSURE PROMPT DELIVERY OF AIRCO OXYGEN.

Digitized by Google

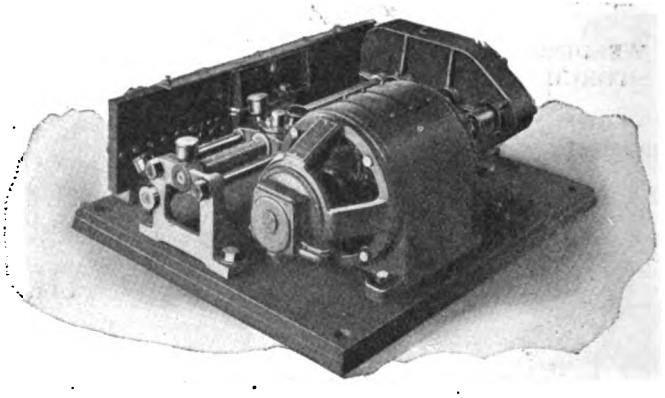
ELECTRIC CONTROL



is the ideal form of transmission. It insures more sensitive control and greater ease of operation than any other. It relieves you of worry about air traps or temperature conditions. It eliminates the necessity of keeping a long line of shafting and gears in perfect alignment. Stretching will not in any way lessen its effectiveness, so that point need not worry you. It is so simple that it is almost impossible to get it out of order. It is very inexpensive in operation because it uses a very small amount of current. Ask us to tell you more about

The Benson Electric Telemotor

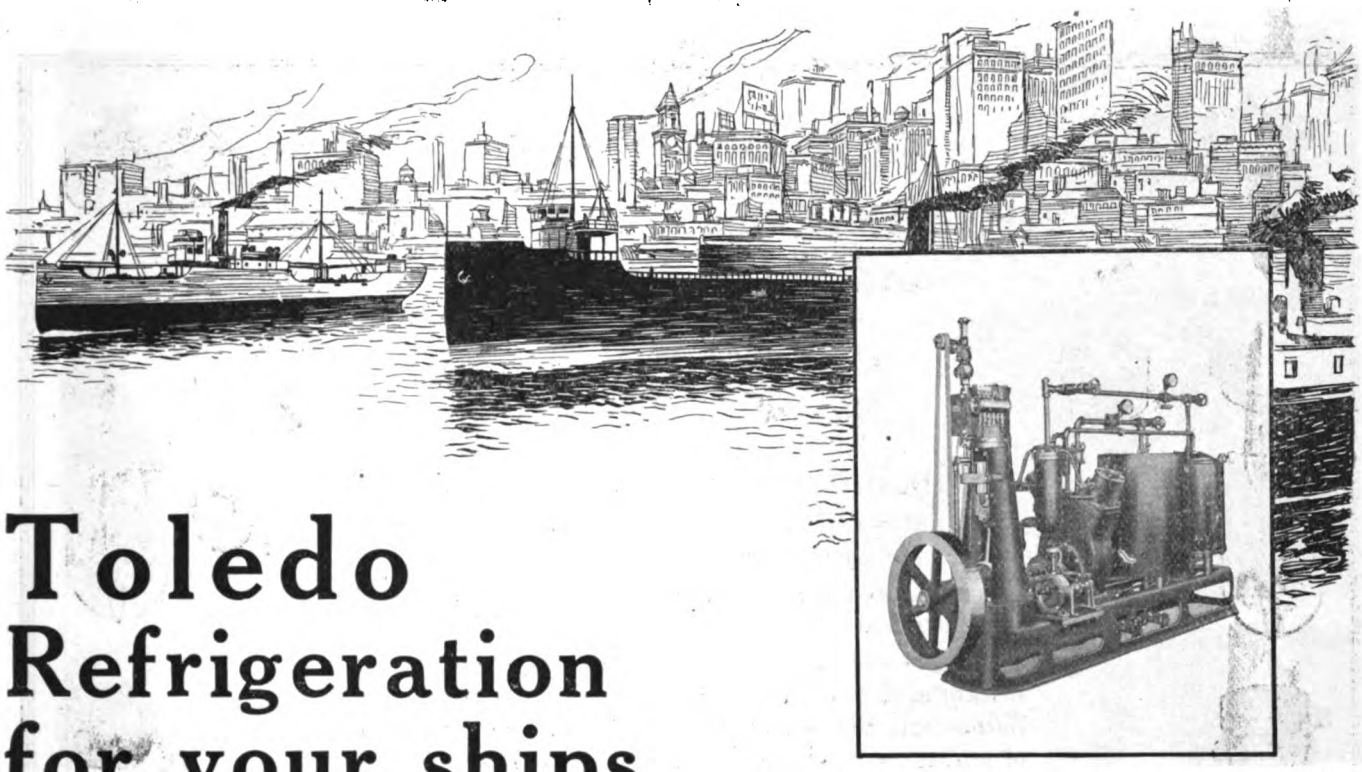
We build a considerable line of steering gears, windlasses, winches, capstans and gypseys, towing machines and ship and dock chandlery. May we put your name on our mailing list for the new catalog soon to be issued?



American Engineering Company

Philadelphia, Pennsylvania

Digitized by Google



Toledo Refrigeration for your ships

When you refit for the 1920 season, put a Toledo Refrigerating unit on those old ships that still use ice.

Ice is costly, wastes space in bunker room, wastes labor and time in stowing and above all is inefficient and unsatisfactory in service.

The Toledo Refrigerating unit is built and shipped in a unit as illustrated above. It saves time and labor in installing and saves considerable space. Your cooling rooms can be enlarged by doing away with the old ice chamber.

You will have double the refrigerating capacity—a *dry* refrigeration that will keep foods in better condition and make crews better satisfied.

The Toledo Refrigeration unit is direct-connected to a slow-speed engine and is of simple and practically fool-proof construction. Hundreds of ships are now using this machine—a sufficient recommendation of its superiority.

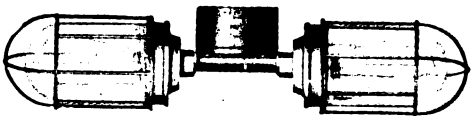
Now is the time to consider the Toledo Refrigerating unit for all your ships—write today for our booklet, "Cold Facts on Marine Refrigeration."

The Refrigeration Engineering Co.

241 Huron St. **Toledo, Ohio**

Digitized by Google

CONVERTIBLE
Marine Electric Fixtures
and Watertight Boxes



Standard Types—New Features

Simplifies and expedites the installation and greatly reduces the cost of labor.

Makes up a substantial high class job of a strictly standard character.

Besides saving real money in the original work, the installing of S-M Marine Electrical fittings benefit the Shipowners because of their durability, the possibility of additions or changes being made without disturbing the original work, and whereas their design allows the use of most any manufacturer's wiring devices, renewals may be readily procured in the open market.

S. M. UNIVERSAL CONDUIT BOX

The only "knockout" box in the market that leaves a threaded outlet ready for pipe by simply knocking out a plug.

A Universal Conduit Box that combines both an Outlet Box and Fixture Body.

Reduces stock assortment, usually provided, about 60% and insures against excess accumulation.

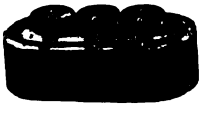
All customary combinations may be made by your electrician or stockkeeper with the few interchangeable parts. May be used for Junction, Switch, Plug, Receptacle, Angle or Pendant Fixtures. The illustrations show interchangeable parts and some of the combinations.

Send for Catalog 15-MR.

SEIDLER-MINER CO., Inc.

ESTABLISHED 1891

DETROIT, U. S. A.



Digitized by Google

BENJAMIN

Marine Lighting & Signaling Apparatus

Standardized Interchangeable

Water Tight Reflector Fixtures

Benjamin Water Tight Reflector Fixtures are furnished with heavy cast-iron hood and *one-piece steel reflector* finished in white porcelain enamel.

Made tight with two gaskets. *Copper holder* is *threaded* to receive heavy clear glass screw globe.

All material is selected and finish applied to meet marine requirements. Metal parts throughout are as completely resistant to corrosive influences as a commercial product can be made.

In Benjamin Marine Lighting and Signaling Apparatus, the line is complete from Water Tight Buzzers to Indicating Pilot House Panel Boards. Illustrated catalogs gladly sent upon request.

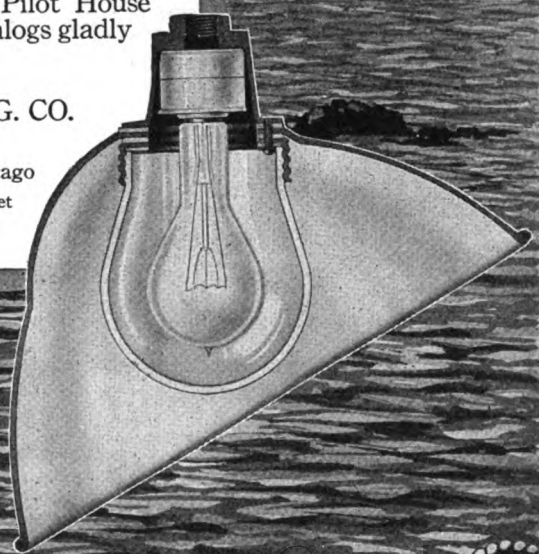
BENJAMIN ELECTRIC MFG. CO.

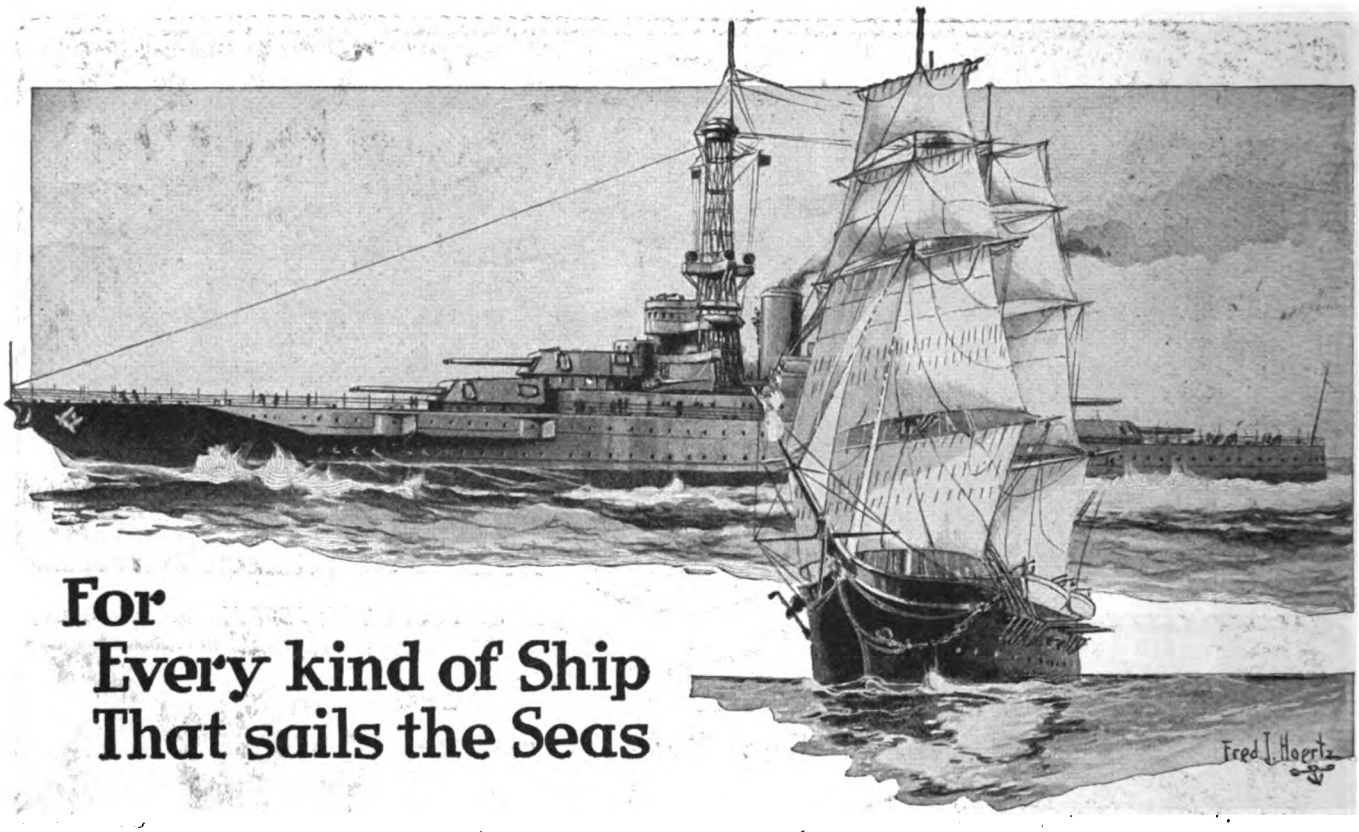
Sales and Distributing Offices:

806 West Washington Street, Chicago

247 West 17th Street, New York

590 Howard Street, San Francisco





For Every kind of Ship That sails the Seas

Square-rigger, cruiser or dreadnaught—the type makes little difference. The General Electric Company manufactures electric equipment for any type and size.

G-E propelling machinery drives the "New Mexico;" G-E ship lighting sets are found on hundreds of ships—on the small "coaster" and on the lumbering "tramp."

G-E equipment for marine use includes the following:—

- Internal Combustion Generating Sets
- Steam Engine Generators
- Turbo Generators
- Motors
- Mazda Lamps
- Arc Lamps
- Searchlights, Incandescent and Arc
- Switchboards
- Meters and Instruments
- Wire and Cable
- Wiring Devices
- Telltale Boards
- Electric Radiators
- Tubular and Luminous

General Electric Company

General Office Schenectady, N.Y.

Digitized by Google

MUTUAL

America's Greatest TRUCK

GREATEST, because it is the only truck that is built *wholly* from units and parts that are themselves the greatest achievements of the automotive industry—and are acknowledged to be such by America's greatest technical and practical authorities.

And it is the greatest, too, because it gives the greatest *truck value* per dollar of price asked.

This value-giving is based on two prime factors:

1st On our building our trucks *over-size*, thruout, so that our *two-ton* Mutual is actually a *three-ton* truck, in engine power, carrying capacity and in the size and dimensions of all its parts. Our 3½ and 5-ton sizes are similarly built for a 50% over-load.

2nd On our policy of being satisfied with *less than half* the profit for ourselves, that is customary with truck companies. For, the Mutual Truck Company is essentially a Community Enterprise, operated with low overhead cost—an enterprise whose prime object is to build up an *industry* at Sullivan, Indiana, that shall employ thousands of men, and thus create an enlarged home market for the farm products, coal, oil and natural gas with which Sullivan County is so richly blest.

We Make Good Our Claim

We realize that we are assuming a grave responsibility in advertising the *Mutual* as "America's Greatest Truck," and that it is only by fulfilling that claim beyond all question that we can realize our ambition and win and hold the permanent good will of truck buyers the world over. Therefore we say:

BUY ONE "MUTUAL"

Put it in your hardest service, and let it make its own place in your esteem.

Send for our Super-Specifications; and let your technical and purchasing managers check them, item by item, against the specifications of the best and highest priced trucks on the market.

MUTUAL TRUCK COMPANY
SULLIVAN INDIANA

Digitized by Google

"AMERICAN"

No. 1 BEST

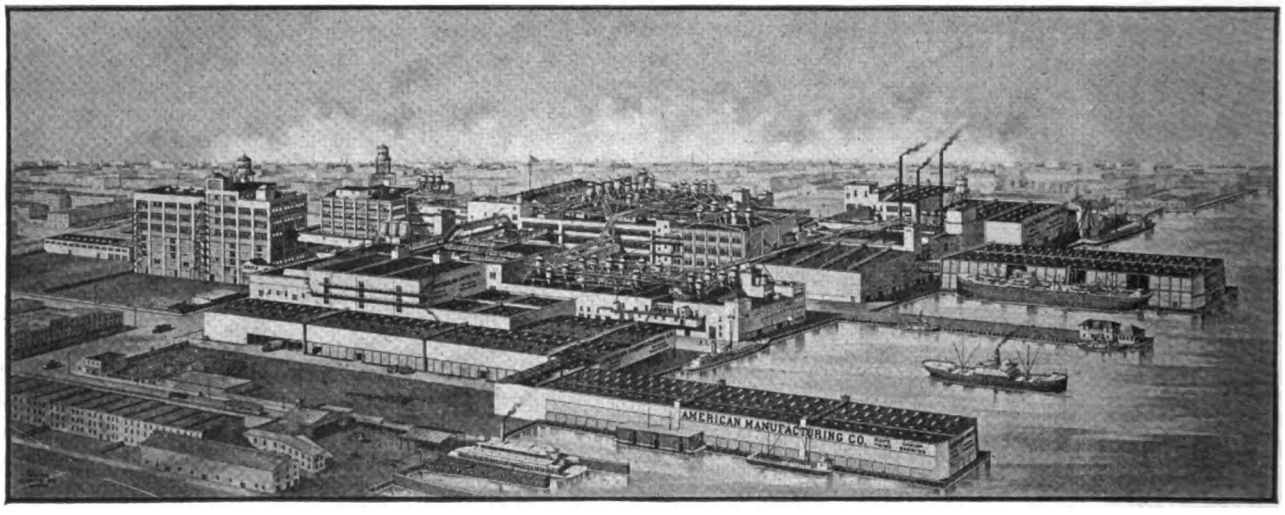
MARINE OAKUM

Made in accordance with National Bureau of Standards specifications and so guaranteed by us

"AMERICAN"

MANILA ROPE

The favorite Rope of the Marine trade



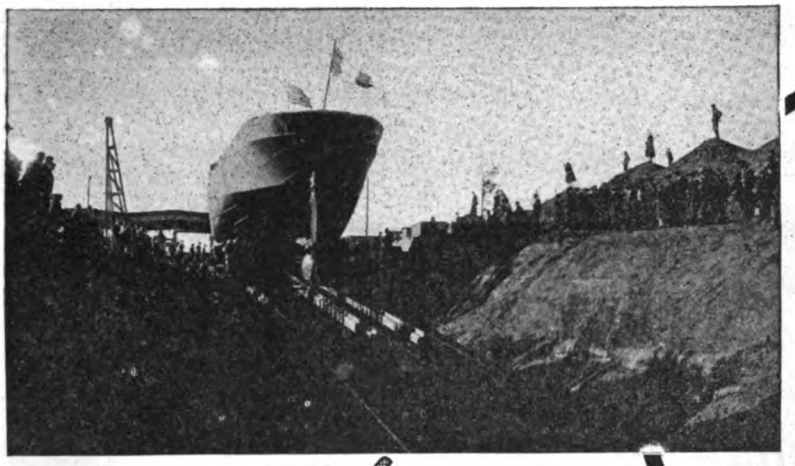
For prices address Dept. T

American Manufacturing Company

Noble & West Streets Brooklyn, N. Y. City

Western Branch—St. Louis Cordage Mills, St. Louis, Mo.

Digitized by Google



The views shown here are of a French Trawler or Mine Sweeper built by the Canadian Car & Foundry Co. "Sirocco" equipped thruout.

"Sirocco"

TRADE MARK

During the war—

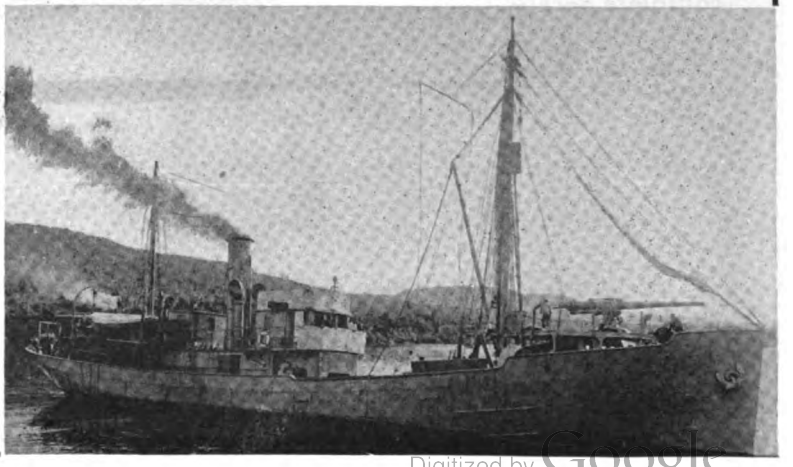
"Sirocco" Equipment stood up under every test, and amply justified every installation to the satisfaction of governments and individuals

Of the hundreds of installations on government built boats, of "Sirocco" Equipment, not one failed in performing to the utmost, the duty required of it.

"Sirocco" Engine Generators, Centrifugal Condenser Pumps, Fans and Blowers withstood the strenuous test of war service unflinchingly.

This same reliability of service is just as essential for the success of private enterprises as it is for government work.

Let us send you our complete descriptive catalog of Forced or Induced Draft Equipment, Engines, Fans or Blowers.



AMERICAN BLOWER COMPANY

DETROIT, MICHIGAN

CANADIAN SIROCCO COMPANY, Limited

Windsor, Ontario

BRANCHES IN ALL LARGE CITIES

Digitized by Google

Dunn Stockless Anchors

American Steel Foundries

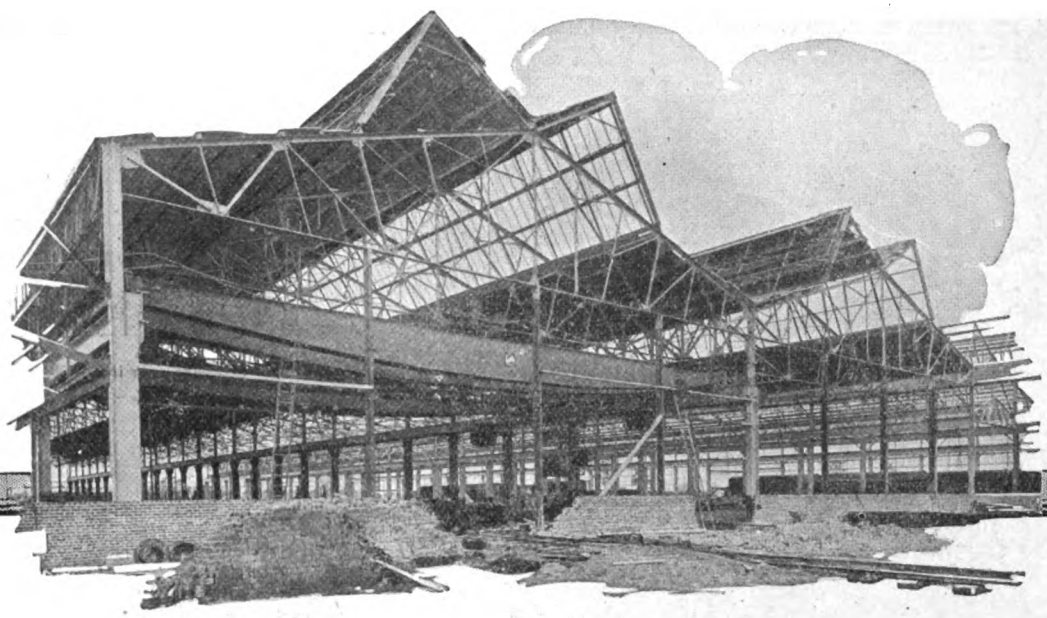
CHICAGO NEW YORK

Used on all classes of vessels from the largest battleships to small fishing smack—and in every instance, even under the most severe conditions, they have made good.

Dunn Stockless Anchors have unfailing holding power; eliminate all chance of fouling; are by far the easiest to operate.

We would like to send you complete details.

Digitized by Google

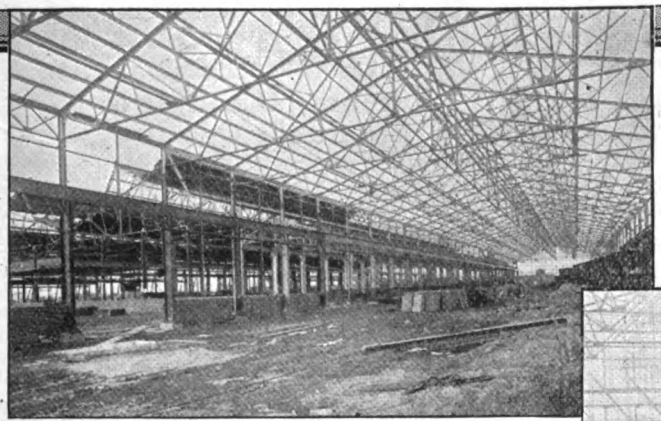


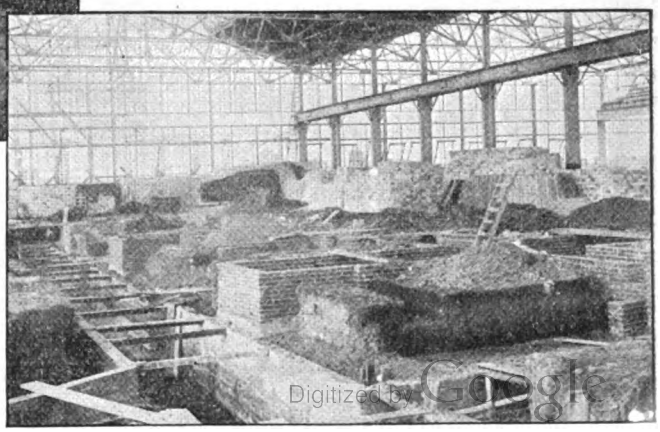
To Serve You Better

TO serve DETROIT'S customers better, to meet their most extensive and exacting seamless steel tubes demands promptly and easily is the real purpose back of DETROIT'S great new plant.

With many of the new plant's buildings nearing completion and some of its wonderfully complete mill equipment in the process of installation, DETROIT looks forward not merely to the early completion of its great new factory, but to the greatly enlarged production schedule, which will supply the every need of her customers promptly and easily.

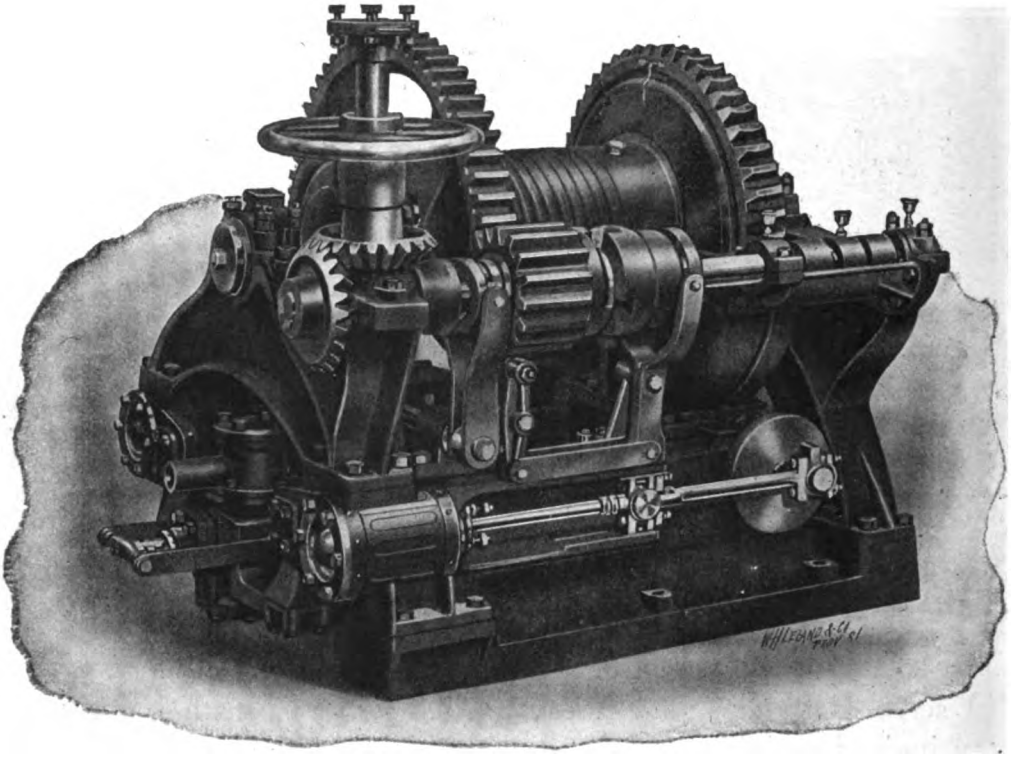
DETROIT SEAMLESS STEEL TUBES COMPANY
DETROIT, MICHIGAN





DETROIT
SEAMLESS STEEL TUBES

Digitized by Google



The Hyde Steam and Hand Steerer, Drum Type

High-Grade Marine Auxiliary Machinery

and

Manganese Bronze Propellers

of all sizes

Windlasses — Steering Engines and Steering Gears—Capstans— Cargo Winches — Steam, Hand and Electrically Operated

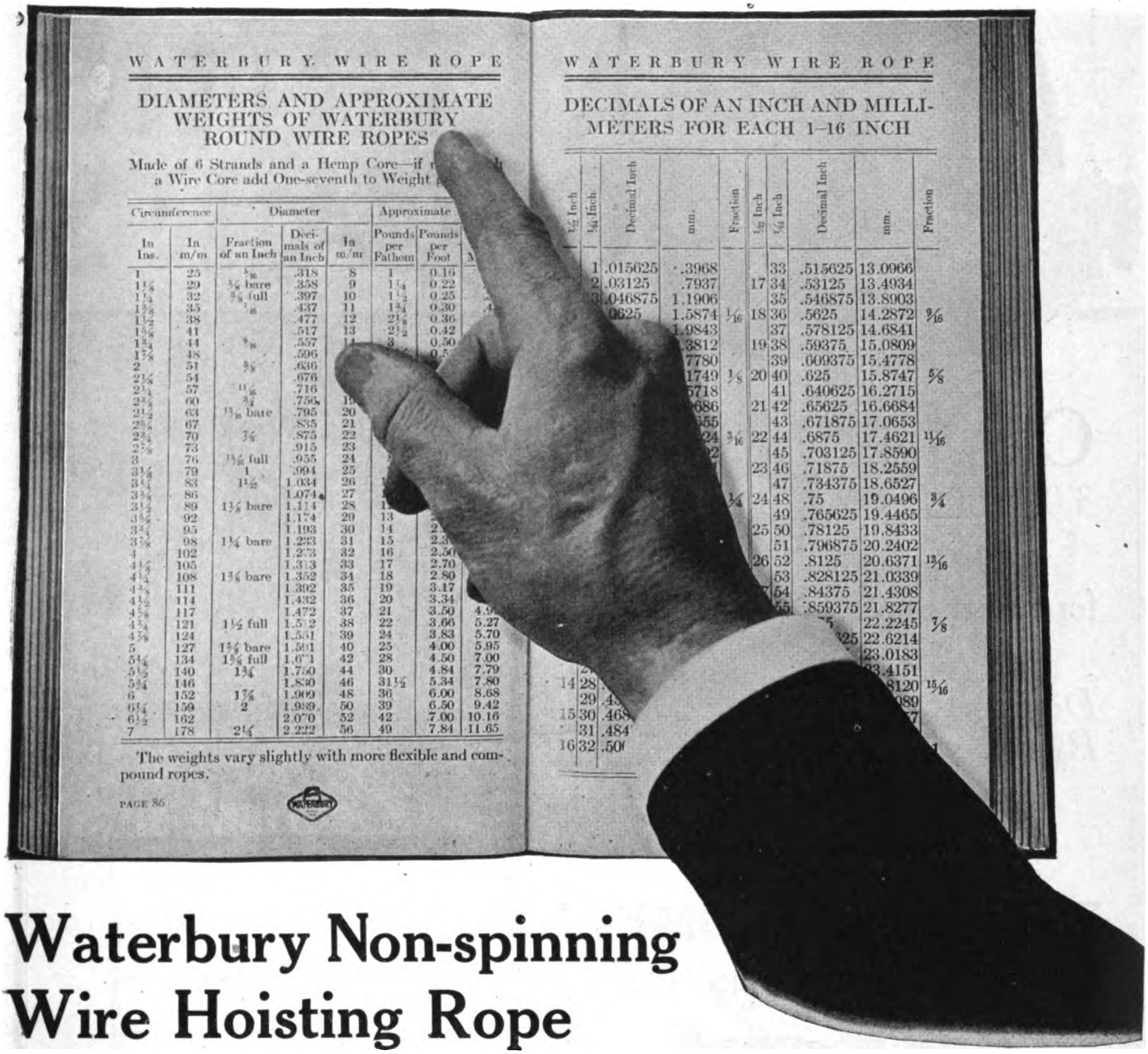
When Ordering Specify

"Hyde"

Hyde Windlass Company, Bath, Me.

New York Representative, Kearfott Engineering Company, 95 Liberty Street, New York

Digitized by Google



Waterbury Non-spinning Wire Hoisting Rope

Hoisting by a single line needs extra men with guide ropes on the load *unless* that single line is Waterbury Non-spinning Wire Rope, which does not rotate, owing to its special construction.*

And Waterbury Non-spinning Hoisting Rope saves more than the time of extra men. Its very lay produces greater flexibility and gives more wearing surface, at the same time affording better internal lubrication—all of which adds to the life of the rope itself.

WATERBURY COMPANY

63 PARK ROW, NEW YORK

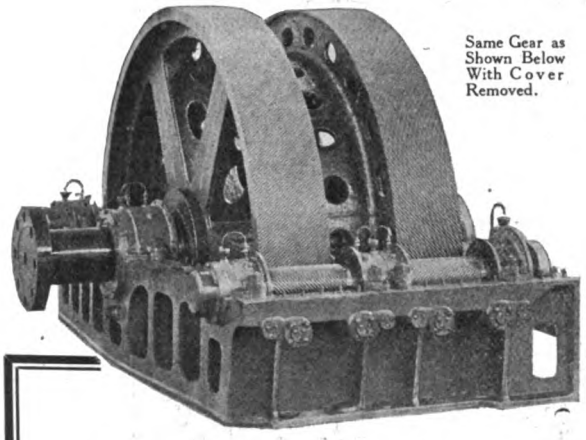
CHICAGO - - - 1315-1321 W. Congress St.
SAN FRANCISCO - - - - 151-161 Main St.
NEW ORLEANS - - 1018 Maison Blanche Bldg.
DALLAS, TEXAS - - - A. T. Powell & Co.

* The Waterbury Rope Handbook explains in detail the construction of this and every other rope. Its varied and complete information will prove a help to economical rope buying or using. Ask for a copy. It's free.

2348-W

WATERBURY

Digitized by Google



Same Gear as Shown Below With Cover Removed.

MARINE GEARS

OUR exceptional facilities for handling Marine Work have enabled us to produce *gears* for this field, aggregating more than 3,000,000 H.P.

We recently closed contracts to furnish *Falk Turbine Gears* for a fleet of fifty new vessels.

Falk Gears are built for *Compound Turbines—Single or Double Reduction* or for *Diesel Type Marine Engines—Single Reduction.*

Consult our Engineering Department.

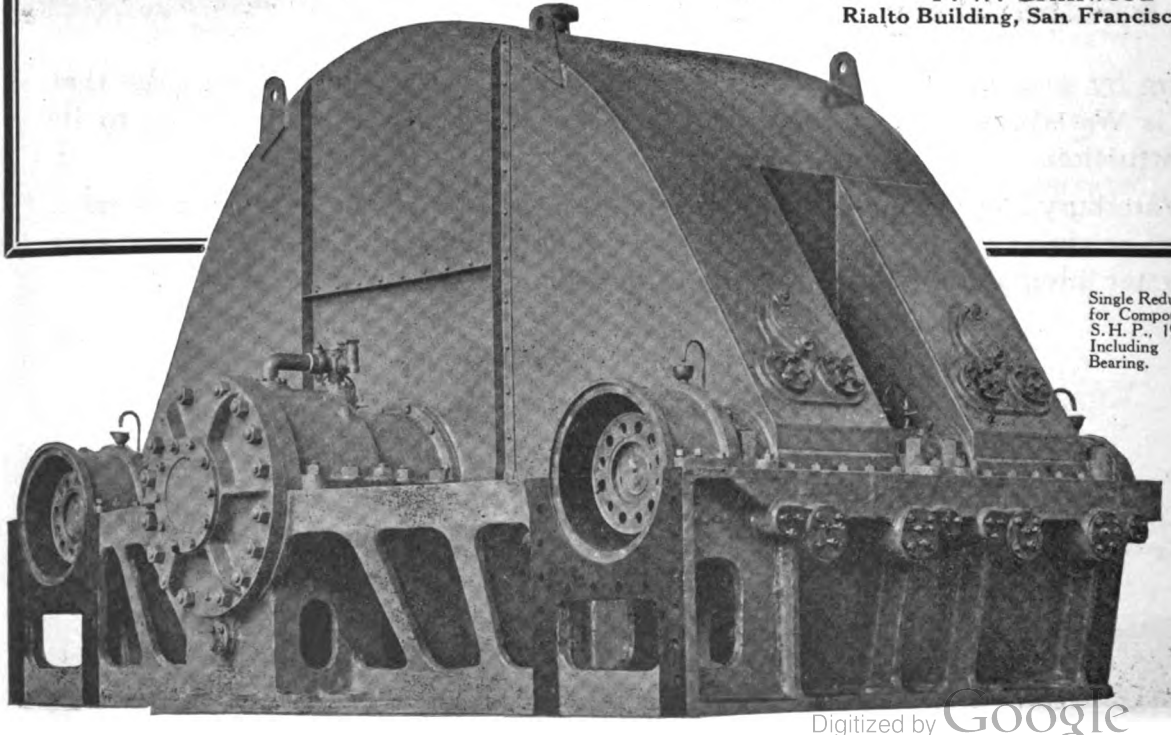
THE FALK COMPANY

MILWAUKEE, WIS., U. S. A.

W. O. Beyer
1024 Park Building, Pittsburgh, Pa.

M. P. Fillingham
50 Church Street, New York City

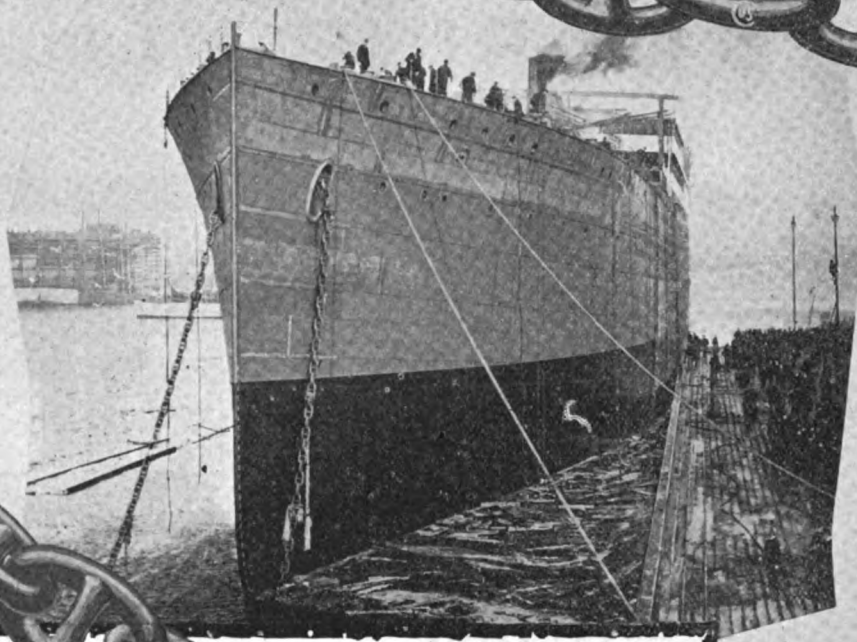
F. W. Grimwood
Rialto Building, San Francisco, Cal.



Single Reduction Marine Gear for Compound Turbines, 6000 S.H.P., 1900 to 132 R.P.M. Including Kingsbury Thrust Bearing.

Digitized by Google

WHEN THE SHIP IS READY *for* LAUNCHING-



Be Sure that you Safeguard it with

U.S. STUD LINK SHIP'S CABLE CHAIN

"As Good as the Name"

Dependable to the Last Link

Your Inquiries Solicited

United States Chain & Forging Co.

Union Arcade Pittsburgh, Pa.

Digitized by Google

CRANE

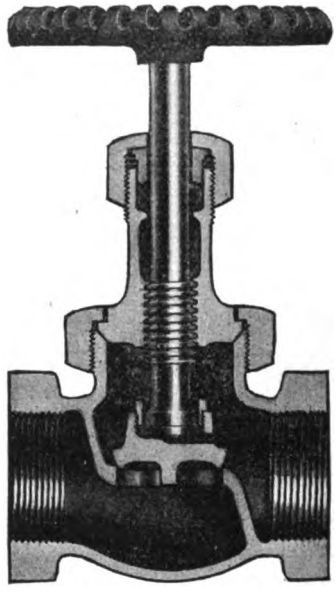
EXTRA HEAVY—REGRINDING—UNION BONNET

MARINE VALVES

Globe

Angle

Cross



No. 82E

These valves may be repacked when wide open and under pressure. They are made with packing gland, and are fitted with strong malleable iron non-heat hand wheel. The Union Bonnet adds strength and durability. They have liberal stem diameters and threads. Recommended for steam working pressures up to 250 pounds.

Sales Offices, Warehouses and Showrooms:

Boston, Springfield, Bridgeport, New York, Brooklyn, Newark, Camden, Philadelphia, Albany, Syracuse, Rochester, Buffalo, Baltimore, Washington, Savannah, Atlanta, Knoxville, Birmingham, Memphis, Little Rock, Muskogee, Tulsa, Oklahoma City, Wichita, St. Louis, Kansas City, Terre Haute, Cincinnati, Indianapolis, Detroit, Chicago, Rockford, Grand Rapids, Davenport, Des Moines, Omaha, Sioux City, St. Paul, Minneapolis, Duluth, Fargo, Watertown, Aberdeen, Great Falls, Billings, Spokane, Seattle, Tacoma, Portland, Pocatello, Salt Lake City, Ogden, Sacramento, Oakland, San Francisco, Los Angeles

FOUNDED BY R. T. CRANE, 1855

CRANE CO.

836 S. MICHIGAN AVE.

CHICAGO

Works: Chicago and Bridgeport.

CRANE, LIMITED—Calgary, Alb., Montreal, Que., Toronto, Ont., Winnipeg, Man., Vancouver, B. C.

Digitized by Google

De Laval 2,500-HP. high and low pressure, two-pinion geared turbine. Propeller speed 110-R. P. M.

14 knot, 12,000 ton boat equipped with De Laval geared turbines

THE vessel shown above is one of the group of 12,000-ton twin-screw 14 knot sister ships each of which is equipped with two 2,500-HP. De Laval compound marine turbines driving the propellers through single gear reductions. { South Bend / Marica / Sol Navis / Edellyn }

All of these vessels are in the transport service and the operation of the De Laval geared turbines has been characterized by high efficiency and exceedingly quiet operation.

Quiet operation of reduction gears is a point that is receiving more and more consideration from shipbuilders as quietness of operation means that the gears are correctly designed, correctly cut and correctly supported.

Noise in gears is also a serious fault from the operator's standpoint as noisy gears cause great inconvenience to the operating crews and make it very difficult to detect troubles that may occur in various parts of the engine room with auxiliaries which would be instantly noted if the gears operated quietly.

Either the high pressure or the low pressure element of each of the compound units described above can be operated upon high pressure steam and the vessel can be propelled by any one of the four turbines alone.

The combination of high and low pressure turbines also renders the unit suitable for high boiler pressure and high vacuum, which is conducive to high efficiency.

All parts of the turbine are easily accessible. Due to the absence of reciprocating and rubbing parts, packings, complicated valve gears, etc., comparatively little attention is required.

Let us give you the names of many other vessels equipped with De Laval gears. After investigation you will choose De Laval gears for your own boats. Ask for Special Publication No. 63.

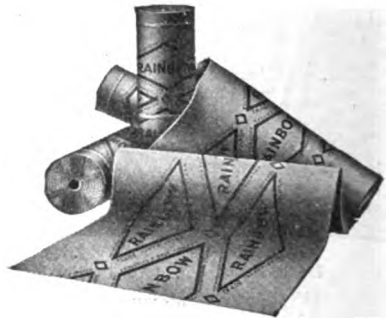
De Laval Steam Turbine Co.

410 Nottingham Way TRENTON, N. J.

Digitized by Google

United States Packings

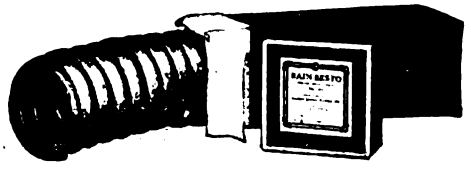
"The Right Packing in the Right Place"

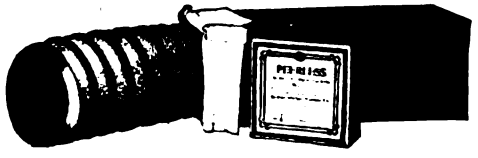


The United States Rubber Company manufactures a specific packing for every known mechanical condition.

Each type, properly applied, will prevent waste of power or material, minimize shutdowns and increase plant efficiency. In thousands of important power plants the worth of United States Packings is being demonstrated daily.

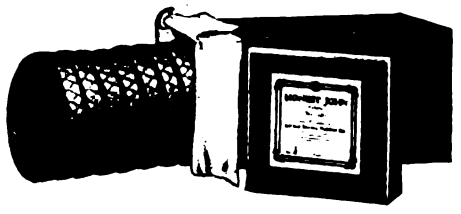
Our engineers are at your service to aid you in determining the most suitable type or combination to meet each of your needs.



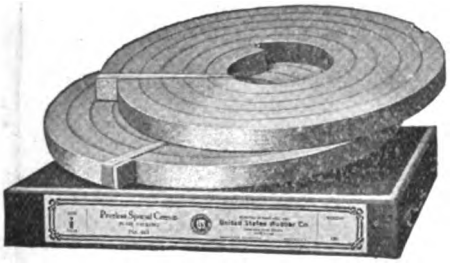


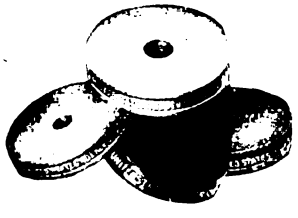
A few of our prominent brands are:

Rainbow Sheet	**Peerless Braided Flax**
Rain-Besto H.P. Spiral	**Peerless Special Canvas Pump**
Peerles Piston	**Vanda Compressed Sheet**
Success Diagonal	**Wizard Valve Stem**
Honest John Hydraulic	**U. S. Rubber Pump Valves**



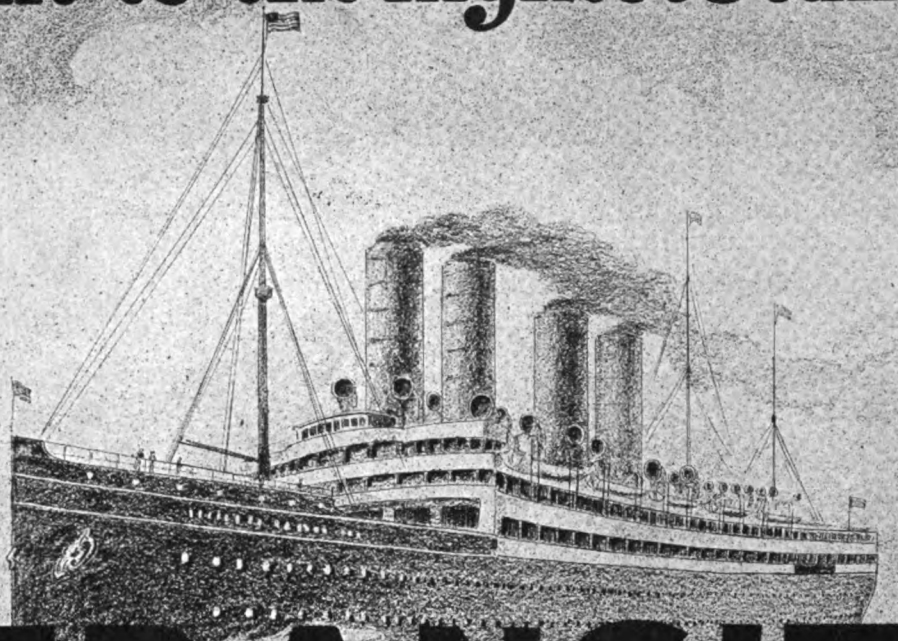
United States Rubber Company





Digitized by Google

"Built to the highest Standard"



TRANSIT
MARINE PUMPS

EFFICIENCY—DURABILITY—ECONOMY

These three qualities have made National Transit Marine Pumps famous wherever pumps are used. They are today carried on ships of our new Merchant Marine to the four corners of the globe and are rendering the same supreme service for which they have been famous for forty years.

We Will Gladly Furnish You With Complete Information.

NATIONAL TRANSIT
PUMP & MACHINE CO.
MAIN OFFICE & WORKS:
OIL CITY, PA.

DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, KANSAS CITY, CLEVELAND AND CHARLOTTE, N.C.

Digitized by Google

Odd, Isn't It

—that some people think of advertising as a means of benefiting only the seller, when its basic function *must be* to render a necessary service to the buyer, else it could not exist. Merchandise lives or dies as it does or does not meet a human need. Advertising is subject to the same law of service. The real measure of its value is what it *gives*, not what it gets.

In the light of these truths, the marvellous growth of advertising in itself, is an impressive demonstration of its essential character in our economic system.

But you are not interested in *all* advertising any more than you are in all merchandise. That is one big reason why you have a highly specialized Business Paper in your field such as the one carrying this advertisement. It was born of your needs, not of any man's desire to be a publisher.

How It Works for You

What it does for you and your field editorially is self evident, but its editorial service is just as vital. Instead of a buyer having to depend upon gossip, hearsay and driblets of information from this or that source, he gets it all between two covers.

Timely, authoritative, comprehensive statements about needed materials pass in review as the advertising pages are turned. Confident judgments can be formed, and intelligent decisions made.

Yet advertising is NOT an *added* expense, but an improved distributive process, which takes the place of slower, more costly and less efficient methods.

That is why it pays to *read* advertising even more than it pays to advertise. Especially if you read it in papers which have met the exacting requirements of membership in The Associated Business Papers, Inc., for one of its standards of practice requires that a paper must *decline any advertisement which has a tendency to mislead or which does not conform to business integrity.*

You are invited to consult us freely about Business Papers or Business Paper advertising

LIST OF MEMBERS

Each has subscribed to and is maintaining the highest standards of practice in their editorial and advertising service.

Advertising and Selling
American Architect
American Blacksmith
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint and Oil Dealer
American Printer
American School Board Journal
Architectural Forum
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries
Bakers Weekly
Boot and Shoe Recorder
Brick and Clay Record
Buildings and Building Management
Building Supply News
Bulletin of Pharmacy
Canadian Grocer
Canadian Railway and Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
Cotton
Daily Iron Trade & Metal Market Report
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter
Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical Review
Electrical World
Embalmer's Monthly
Engineering World
Engineering and Mining Journal
Engineering News-Record
Factory
Farm Machinery—Farm Power
Foundry (The)
Furniture Journal
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal
Gas Age
Gas Record
Grand Rapids Furniture Record
Haberdasher
Hardware Age

LIST OF MEMBERS

(*Continued*)

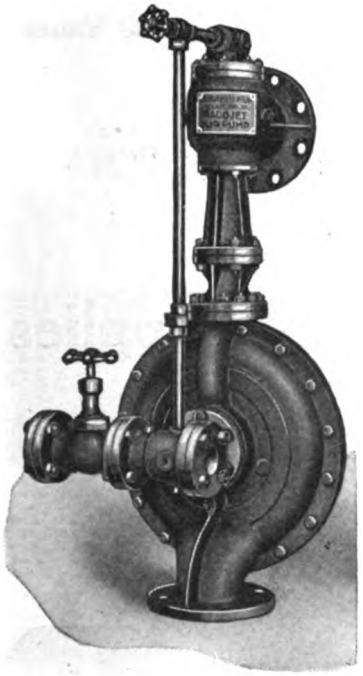
Heating and Ventilating Magazine
Hide and Leather
Hotel Monthly
Illustrated Milliner
Implement and Tractor Age
Industrial Arts Magazine
Inland Printer
Iron Age
Iron Trade Review
Lumber
Lumber Trade Journal
Lumber World Review
Manufacturers' Record
Manufacturing Jeweler
Marine Engineering
Marine Review
Metal Worker, Plumber and Steam Fitter
Mining and Scientific Press
Millinery Trade Review
Mill Supplies
Modern Hospital
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World
National Builder
National Druggist
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Nugent's, The Garment Weekly
Oil Trade Journal
Power
Power Boating
Power Plant Engineering
Price Current—Grain Reporter
Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rubber Age
Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
Southern Engineer
Southern Hardware and Implement Journal
Sporting Goods Dealer
Starchroom Laundry Journal
Tea and Coffee Trade Journal
Textile World Journal
Timberman
Transfer and Storage
Woodworker

THE ASSOCIATED BUSINESS PAPERS, INC.

JESSE H. NEAL, EXECUTIVE SECRETARY

HEADQUARTERS: 220 West 42nd Street NEW YORK CITY

Digitized by Google



RADOJET

We Specialize in the Design and Construction of

Surface and Jet Condensers

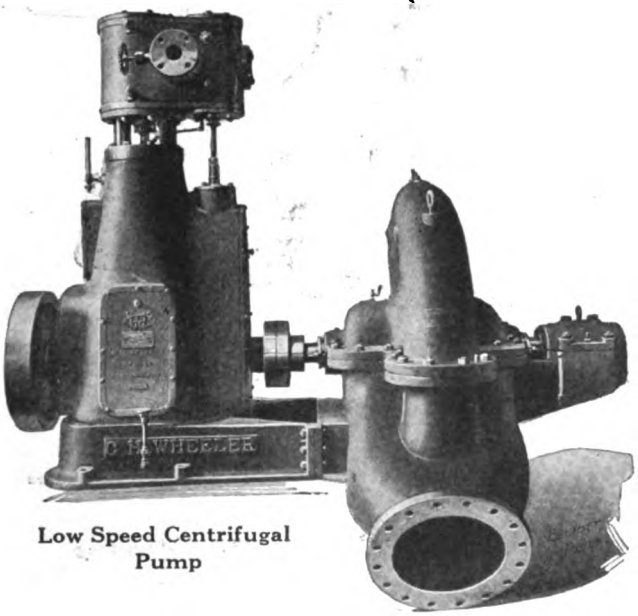
RADOJET AIR PUMPS

Fulfill all the requirements for marine service

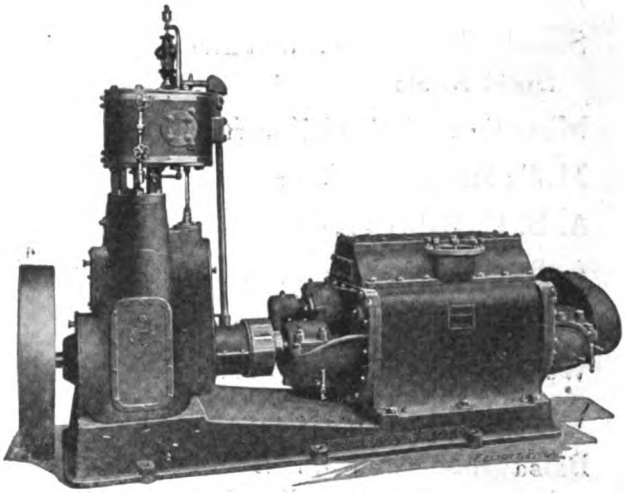
Smallest weight
Highest economy
No lubrication
Reliable and noiseless operation
No moving parts
No foundation

Radojet Ejector Air Pumps

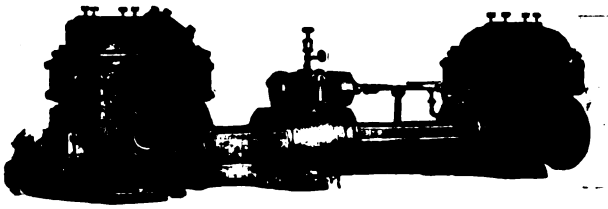
Over 4,000,000 H. P. sold.
Three years successful operation.
28.8 to 29.3 vacuum when operating under full load conditions.



Low Speed Centrifugal Pump



ROTREX Suction Valveless Rotary Type Vacuum Pump



Combined Air and Circulating Pump

C. H. Wheeler Manufacturing Company

Main Office and Works: Philadelphia, Penna.

Branch Offices: NEW YORK, BOSTON, CHICAGO, PITTSBURGH, SAN FRANCISCO, SEATTLE, CHARLOTTE, NEW ORLEANS

Digitized by Google

A Reputation for *Quality* and *Service* is back of all our products

Manufacturers of

MARINE SPECIALTIES

Welin Quadrant Davits
Norton Sheath Screw Davits
Compensating Quadrant Cranes
Lundin Decked Lifeboats
Lundin Power Lifeboats
Standard Metallic Lifeboats with Steel Keels
Metallic Cylinder Liferafts
Mill's Releasing Gear
A. B. C. Balsa Life Preservers
A. B. C. Balsa Life Rafts
A. B. C. Balsa Ring Buoys
Welin Non-Toppling Blocks
Welin Gripe Release Gear
Balsa Insulation for Ships, Ice Boxes, Railway Refrigerator Cars, etc.

Catalog 3 on Request

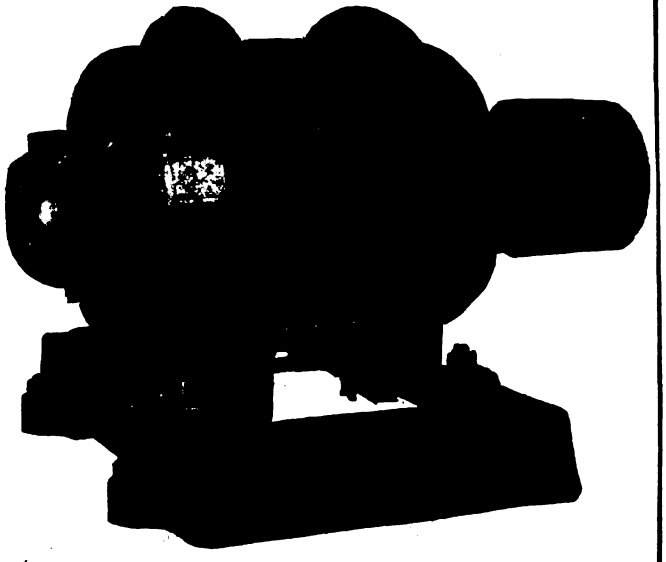
AMERICAN BALSA COMPANY
Incorporated
(Successors to Welin Marine Equipment Company)
50 East 42nd St. New York City

Use the nearest of our 40 distributing houses for quick shipments of

Western Electric

Motors and Electrical Supplies

Everything Electrical for Ships and Shipyards



A Western Electric Induction Motor
Send for bulletins

Watertight Push Buttons and Bells	**Conduit and all Conduit Supplies**
Receptacles and Plugs	**Metal Moulding**
Stuffing Boxes	**Wire and all Cables**
Junction Boxes	
Bulkhead Fixtures	**Insulating Material**

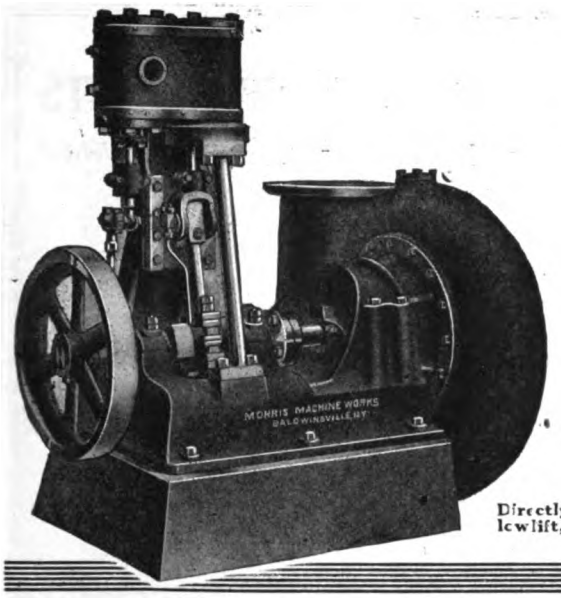
Get prices from our nearest house

Western Electric Company
INCORPORATED

New York	Atlanta	Chicago	St. Louis	San Francisco
Syracuse	Baltimore	Cleveland	Duluth	Oakland
Newark	Richmond	Buffalo	Cincinnati	Los Angeles
Boston	Memphis	Indianapolis	Kansas City	Seattle
New Haven	Savannah	Detroit	Omaha	Portland
Providence	Charlotte	Milwaukee	Oklahoma City	Spokane
Philadelphia	Birmingham	Minneapolis	Dallas	Salt Lake City
Pittsburgh	New Orleans	St. Paul	Houston	Denver

EQUIPMENT FOR EVERY ELECTRICAL NEED

Digitized by Google



Directly-connected, low lift, suction pump.

Marine Service Pumps

WE BUILD a complete line of pumps for marine service. These pumps range in size and use, from pumps for supplying the ship's water to mammoth Dry Dock Pumps.

Built for Belt, Direct-connected, Steam or Motor drive.

Write for our Catalog.

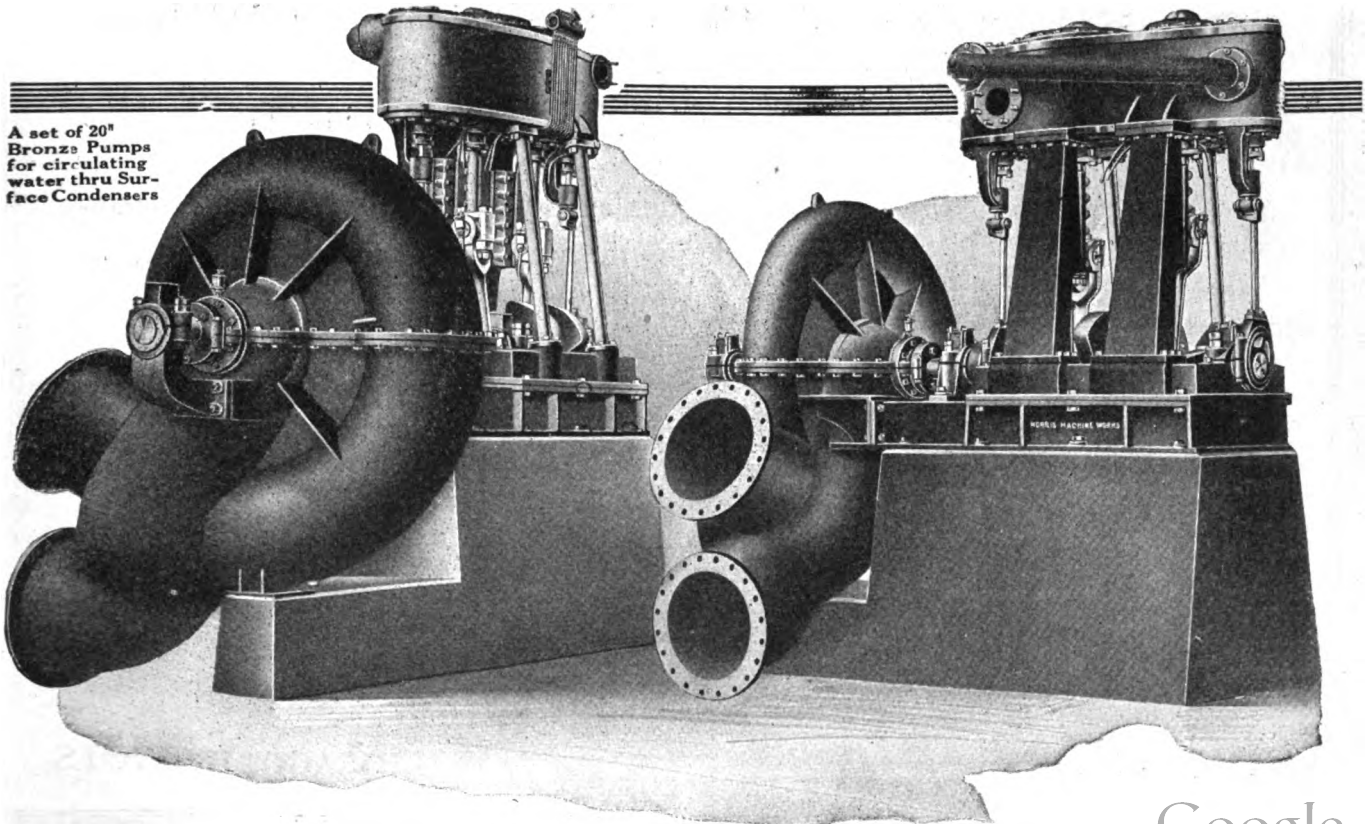
MORRIS MACHINE WORKS

Builders of Dredges, Centrifugal Pumps and Steam Engines

Established 1864

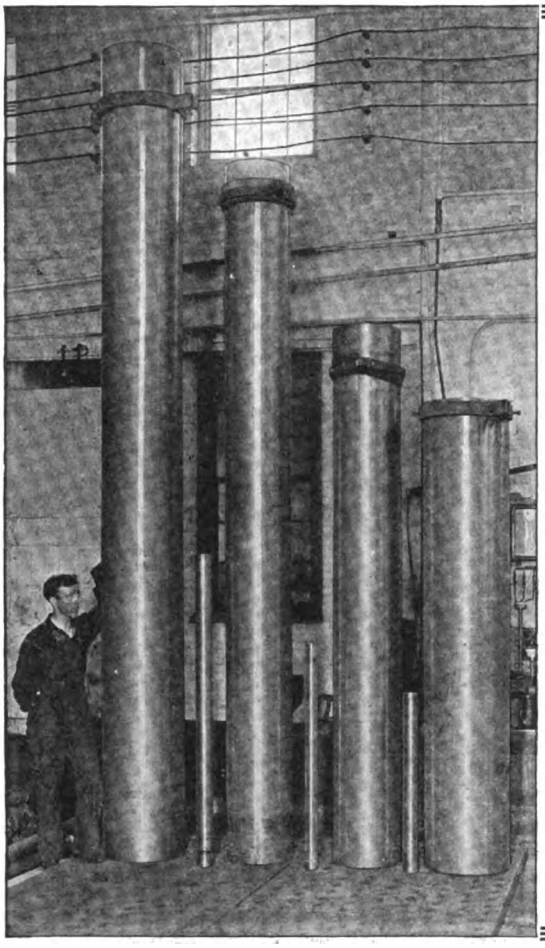
Baldwinsville, N. Y.

Branch Offices in Principal Cities



A set of 20" Bronze Pumps for circulating water thru Surface Condensers

Digitized by Google



ELIMINATE EXPENSIVE EXPERIMENTS

Secure your PROPELLER SHAFT SLEEVES *finished and ready for shrinking or pressing on.*

We insure our customers against expensive experiments by furnishing sleeves all finished machined, bored smooth and true, ready for shrinking or pressing on, rough turned to within ⅛ inch of the sleeve's finished diameter, where finish turning after the securing of the sleeves on the shafts is desired.

All tubes seamless, fluid compressed by our own patented process.

Our tubing is made by our own patented process which compresses the metal while still in the fluid state and in so doing frees it from all gases and impurities which would otherwise be present and form blow holes. The metals used in the alloy as well as the ultimate composition are constantly tested in our carefully appointed and scientifically equipped Metallurgical Testing Laboratory for physical and chemical properties.

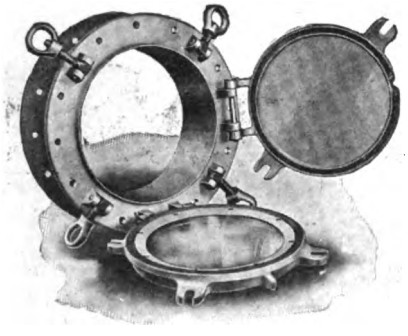
Our shipping facilities by either rail or water are excellent.

FOLLOWING ARE A FEW USERS:

United States Navy, United States Shipping Board Emergency Fleet Corp., Bethlehem Shipbuilding Corp. Fore River Shipbuilding Corp., Wm. Cramp & Son Ship and Engine Bldg. Co., New York Shipbuilding Corp., Newport News Shipbuilding and Dry Dock Co., American Shipbuilding Co., Buffalo Dry Dock Co., Detroit Shipbuilding Co., Toledo Shipbuilding Co., Duluth Iron Works, James Robertson Co., Ltd., American Bridge Co., Federal Shipbuilding Corp., and many other large and prominent concerns.

The Sandusky Foundry & Machine Co.
Sandusky, Ohio

Eastern Representative,
Nelson, Lodge & Snyder, 428 Widener Bldg., Philadelphia, Pa.



Carpenter Air Port
Approved by the Shipping Board

Ship Builders' Supplies and Equipment

Our record in supplying the needs of the government during the war is a guarantee of our ability to take care of your requirements no matter how large they may be.

Port Lights, Bulkhead Lights, Chocks, Cleats, Chain, Bolts, Nuts, Spikes, Washers, Clinch Rings, Rivets, Special Canvas Goods, Air Hose

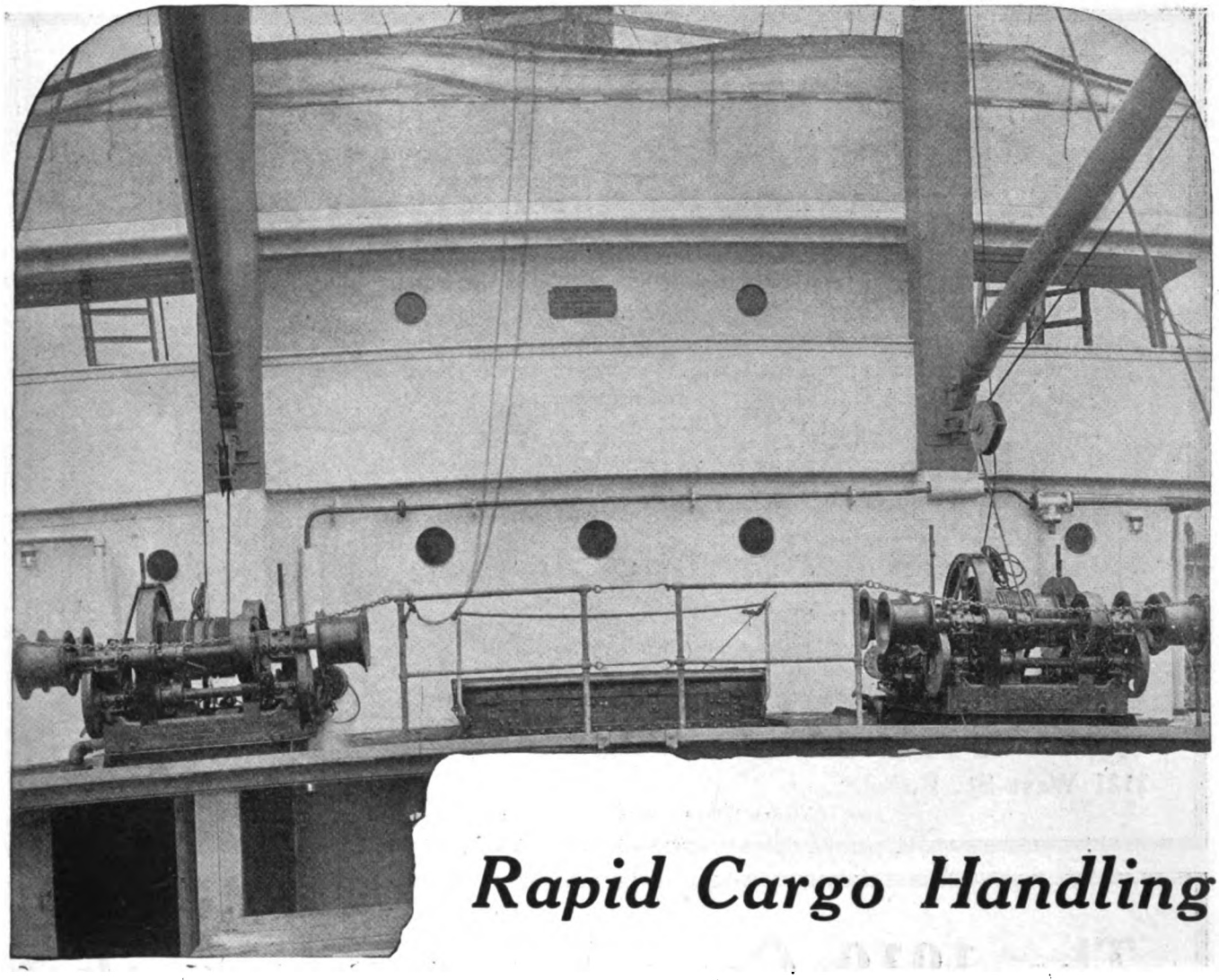
SHIP TOOLS OF ALL KINDS

Our No. 110 Catalogue covers the field completely. Send for a copy, it's free.

GEO·B·CARPENTER & CO.

436 N. Wells Street **CHICAGO, ILLINOIS**

Digitized by Google



Rapid Cargo Handling

WITH labor high and scarce the responsibility for the loading and discharging time falls on the equipment.

"American" Cargo Winches provide the most efficient means for this rapid, safe handling of cargoes. They are included in the equipment of many of the newest and most modern ships afloat and building.

American Cargo Winches represent over thirty-seven years' experience in building hoists and derricks of the highest standard.

No matter where you are, an "American" representative can reach you in 24 hours.

NEW YORK—CHICAGO—SEATTLE—PITTSBURGH—NEW ORLEANS—DETROIT

AMERICAN HOIST & DERRICK CO.

67 So. ROBERT ST.

ST. PAUL, MINNESOTA

Builders of "American" Marine Deck Machinery and Tackle

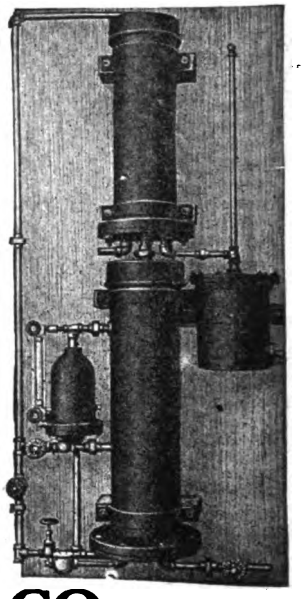
AMERICAN

HOIST & DERRICK CO.

Digitized by Google

Reilly Evaporator Plants For Lake Steamers

In order to comply with the U. S. Law, all vessels operating on the Great Lakes must carry equipment for producing pure drinking water. The Reilly Evaporating Plant is small in size and specially designed for this service. It consists of a Reilly Evaporator, Reilly Distiller, equipped with seamless drawn copper coils fitted with patented screwed union joints, Aerating Filter, Feeder, Trap, etc., and provides:



Pure Drinking Water
at
Low Operating Cost

Occupies space of 3 ft. by 7 ft.
Capacities from 10 gallons per hour upwards.

Write for further particulars.

THE GRISCOM-RUSSELL CO.

2121 West St. Building - - - - - NEW YORK

Chicago Office: 835-A Monadnock Building

The 1919 Great Lakes Red Book

THE VEST-POCKET DIRECTORY OF THE GREAT LAKES VESSEL TRADE

It contains a list of all the vessels plying the Great Lakes and tells the names of the owner, the captain and the engineer of each boat. Contains a separate list of the ore carriers showing the capacity of each, and a list of the supply houses, fuel docks, repair men, etc., at each port.

It's the only vest pocket directory of the vessel trade of the Great Lakes and is a valuable handy reference book both for the salesman calling on his trade and the captain, engineer or sailor who wants to keep in touch with his former sailing mates.

Only a limited edition was printed this year so if you haven't got your copy yet send for it now before the supply is sold out.

ONLY $1.00 A COPY INCLUDING DELIVERY

Send your order today direct to

The Marine Review

Penton Building Cleveland, Ohio

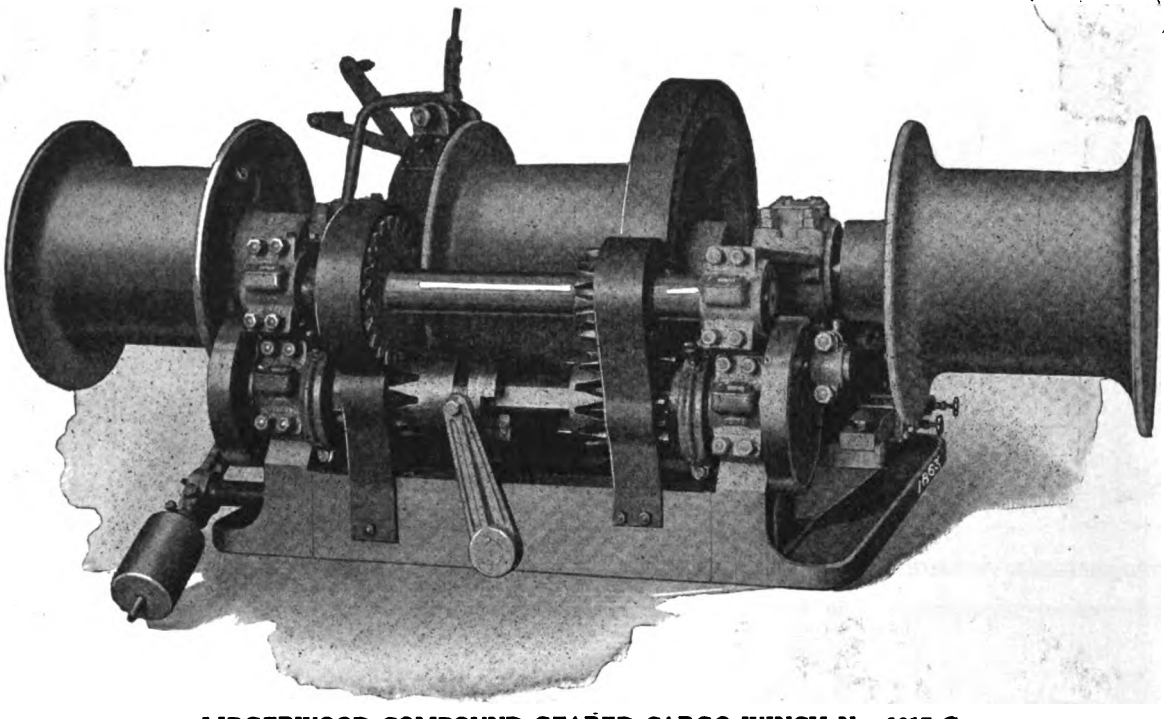
216

Digitized by Google

LIDGERWOOD
STANDARD WINCHES

SINGLE GEARED
CATALOG No. 1917

COMPOUND GEARED
CATALOG No. 1917-C



LIDGERWOOD COMPOUND GEARED CARGO WINCH No. 1917-C

Drum holds 800 feet of ¾" rope and delivers a line pull of 10,000 lbs. with drum full of rope.

Built for handling a 30 Ton Boom with eight part purchase.

Light Loads at High Speed, Heavy Loads at Slow Speed.

Simple in control.
All gears steel.

One lever hoists, holds and lowers.
All parts interchangeable.

Lidgerwood Compound Geared Cargo Winch No. 1917-C is exactly interchangeable on the same bedplate and pipe flanges with Lidgerwood Standard No. 1917 Winch over 6000 of which have been constructed and sold.

SHIP AND DOCK WINCHES — TOWING ENGINES — STEERING ENGINES

Send for catalog MARINE MACHINERY

LIDGERWOOD MFG. CO.,

96 Liberty St.
NEW YORK

BRANCHES
Chicago, Cleveland, Detroit, Pittsburgh, Philadelphia, Seattle,
Los Angeles, London, Eng.

Digitized by Google

CHAS. CORY & SON, Inc.

EST. 1845

NEW YORK 290 Hudson St. Main Office and Factory
PHILADELPHIA 207 Market St.
SEATTLE 83 Columbia St.
SAN FRANCISCO 585 Mission St.

Electrical

SHIPS TELEGRAPHS
MARINE LIGHTING FIXTURES
AND
WIRING APPLIANCES

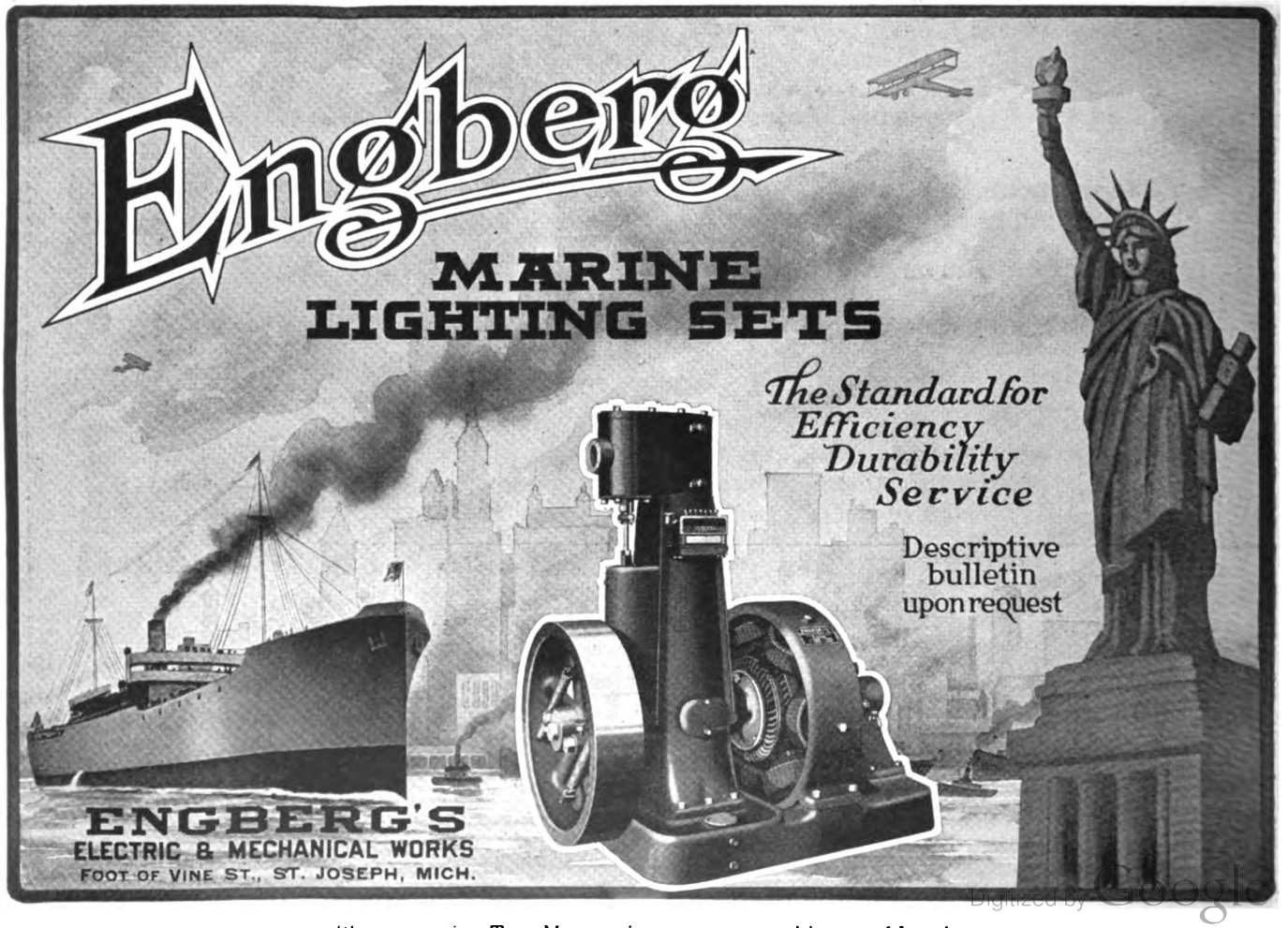
Fire Alarm Systems
Engine Speed Indicators
Loud Speaking Telephones
Rudder Angle Indicators
Electric Whistle Operators
Boiler Fire Timing Systems
Inter-Communicating Telephones
Oil and Water Level Indicators
Electric State Room Heaters

Annunciators
Call Bells
Push Buttons
Voice Tubes
Voice Tube Fittings
Mechanical Engine Gongs
Jingle Bells, Pulls,
Sounders, Pulleys, Etc.

Originators and Designers of Fire-Control and Inter-Communicating Systems for Naval and Merchant Vessels.

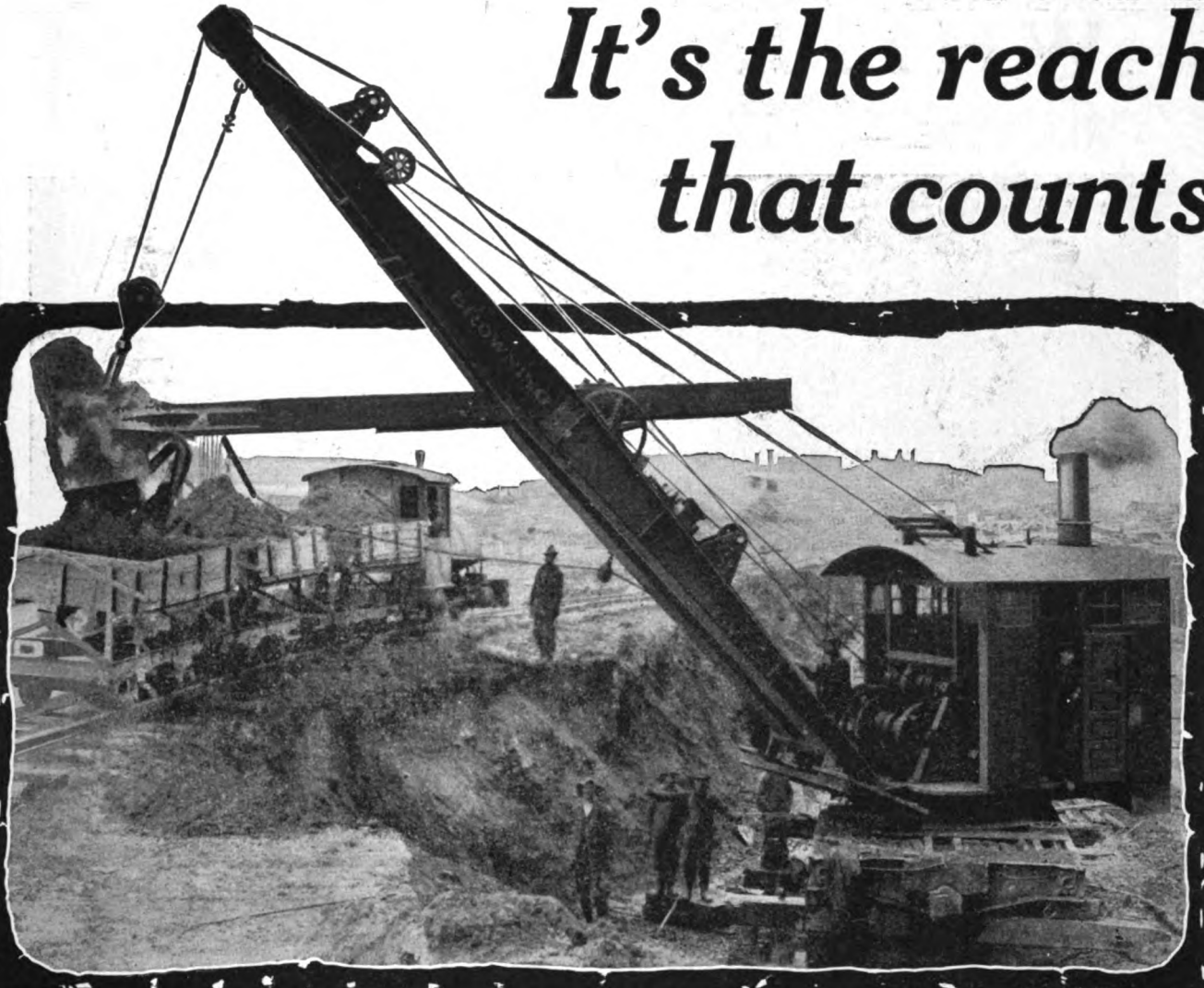
COMPLETE ELECTRICAL AND MECHANICAL INSTALLATIONS SOLICITED

Mechanical



Digitized by Google

It's the reach that counts



All-Around Adaptability Spells Profits

WHEN you buy a Browning Crane you know that you are protected on every job. The owner of this Browning Crane did not have to buy a steam shovel when this job of excavating came along. Note the long reach and high dump. When you consider that tomorrow this same crane may be driving piles and the following day setting structural steel or handling a bucket, you will understand why Browning Locomotive Cranes are such profit makers.

A catalog illustrating the wide adaptability of Browning Cranes sent on request.

THE BROWNING COMPANY
CLEVELAND, OHIO

SALES OFFICES

New York, Chicago, Seattle, Portland, Salt Lake City, Los Angeles, San Francisco, Montreal, Washington, D. C.

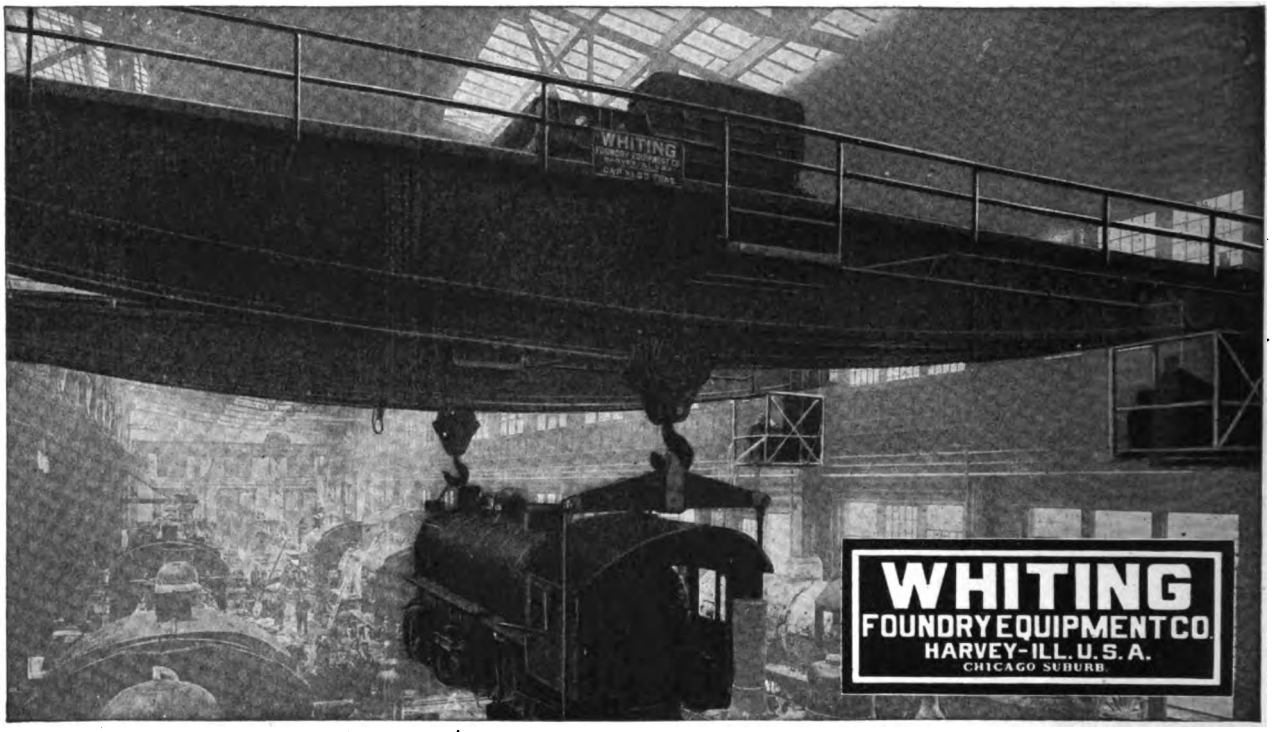
BROWNING

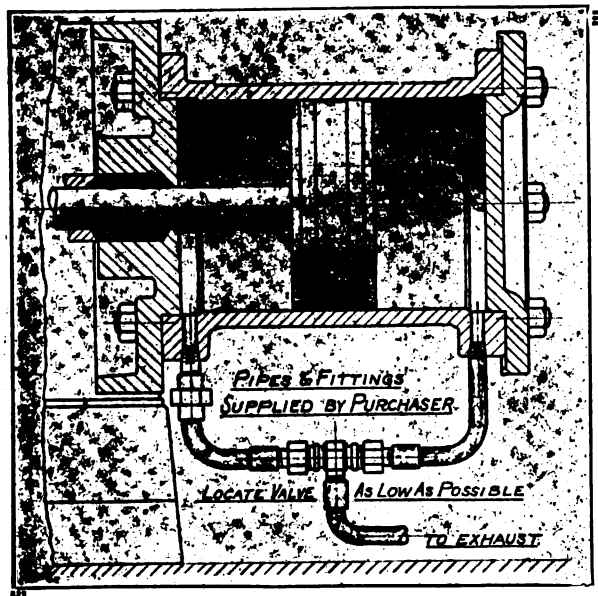
"The All-Around Champion"

Digitized by Google

WHITING CRANES

FOR SAFE, SATISFACTORY SERVICE
ALL TYPES—1 TO 250 TONS CAPACITY—ANY SPAN





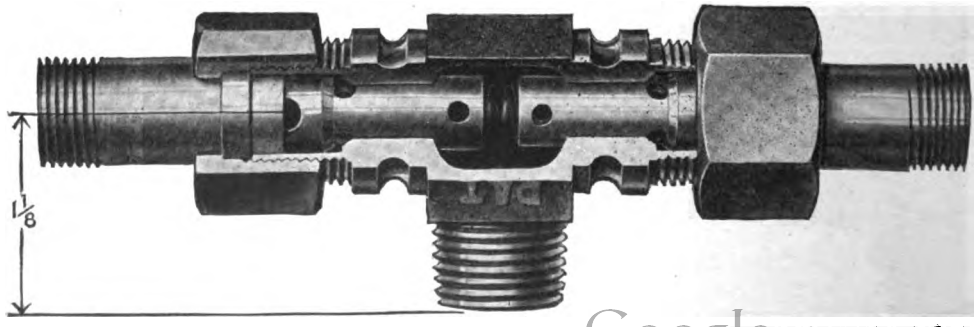
The Dew Automatic Relief Valve
for
Draining Steam Cylinders

Dew Valve Company, Inc.

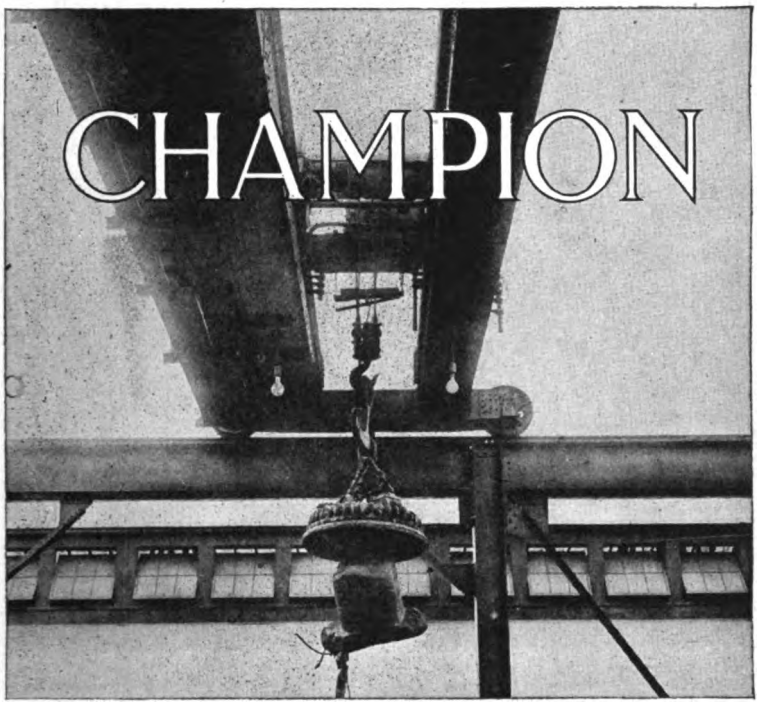
Main Offices and Sales Department
149 Broadway, New York City

Successfully in use on Auxiliary machinery, on various Steamship Lines and in use in many Stationary Plants.

Manufacturers of Kinghorn Valves



Digitized by Google



CHAMPION CRANES

CHAMPION
CRANES

FROM THE OPERATOR'S VIEWPOINT

Operators of Champion Cranes have pride and confidence in the performance of their machines. The sturdy strength of the crane as viewed from the operator's cage builds confidence. The easy interchangeability of all parts wins the enthusiasm of the crane operator—it lessens his work and he knows that it is an important part in the scientific design of Champion Cranes.

After a careful test at our factory under actual operating conditions, the crane is taken down and packed in a manner that insures it against damage en route, and makes it easy to reassemble at its destination.

THE CHAMPION ENGINEERING CO.

ENGINEERS — MANUFACTURERS — KENTON — OHIO

R. W. Valls, Vice-President and Chief Engineer

NEW YORK
J. W. Spensley, Sales Engr.
149 Broadway

PORTLAND, ORE.
Portland Machinery Co.
62 First St.

PHILADELPHIA
Williams & Thomas Machinery Co.
829 Commercial Trust Bldg.

PITTSBURGH
Laughlin-Barney Machinery Co.
Union Arcade

SEATTLE
Hallidie Machinery Co.
L. C. Smith Bldg

PARIS, FRANCE
L. & E. Frenkel, Inc.
20 Rue des Capucines

TOLEDO
W. C. Lloyd & Co.
1113 Second National Bank Building

SAN FRANCISCO
Louis G. Henes
76 Freemont St.

LOS ANGELES
Louis G. Henes
Title Insurance Building

MARINE FORCED DRAFT

Designers of Complete Forced Draft Installations for Marine Work

Plans, Specifications and Estimates Furnished

Manufacturers of RELIANCE Standard Interchangeable Furnace Fronts for Coal and Oil Fuel. Low Speed Radial Fans fitted with RELIANCE enclosed Forced Lubricated Engines. Retarders and minor fittings in all branches.

Large stocks carried of Standard Fronts, Fans and Engines ensuring quickest deliveries for emergency or repair work.

JOHN REID & COMPANY

HEAD OFFICE:

Hudson Terminals, 30 Church Street, NEW YORK

MONTREAL
Board of Trade Bldg.

LONDON
4 Lloyds Ave., E. C.

GLASGOW
50 Wellington St.

Morison Suspension Boiler Furnaces

For Land and Marine Boilers

Uniform Thickness **Easily Cleaned** **Unexcelled for Strength**

Also FOX CORRUGATED FURNACES

Manufactured by

THE CONTINENTAL IRON WORKS

West and Calyer Sts., BOROUGH OF BROOKLYN, N. Y.

ESTABLISHED 1859 Greenpoint Ferry from East 23rd Street, New York INCORPORATED 1887

Digitized by Google

FOR

STEAMSHIPS

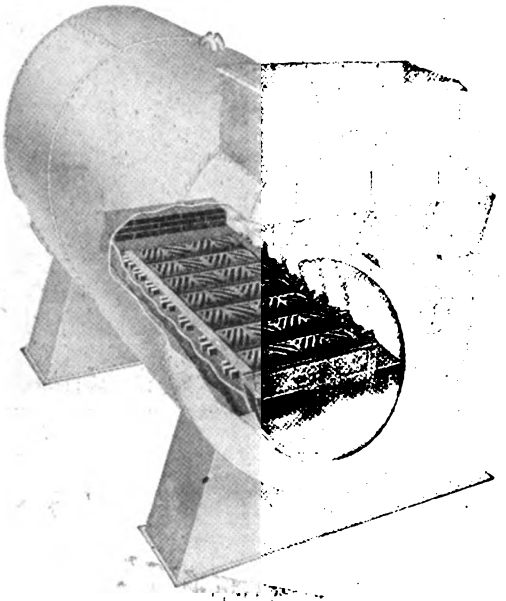
Scotch Marine—Marine—Locomotive Fire Boxes and Furnaces

Fire Without Having A Cleaning Period On

Thomas W S D Grate Bars

For Use with Either Natural, Induced or Forced Draft
FOR DETAILED INFORMATION WRITE

THOMAS GRATE BAR COMPANY
BIRMINGHAM, ALA.



SCOTCH MARINE BOILERS

P 192

THE GENERAL TRANSIT CO.
LEADER-NEWS BUILDING
CLEVELAND, OHIO

Sept. 4, 1918.

Thomas Grate Bar Co.,
Hippodrome Building,
City;

Gentlemen:

Regarding the set of Thomas Grate Bars installed aboard the Steamer "THOMAS MAYTHAM" last spring, will advise that the Engineer of this vessel reports a very material saving in fuel when in port this season, over the amount used in port last season; in addition to the above we find that in making comparison with the fuel used last year from fit out to Aug. 1st, figuring on an outside running basis, we have saved approximately 87 tons of coal in the first 94 days operation, or nearly a ton a day.

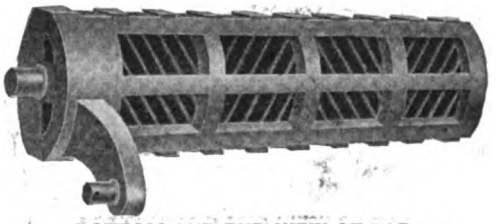
In view of the above, we are pleased to advise that the bars have given good satisfaction and when ordering sets in the future, we will specify the Thomas bar.

Yours very truly,

THE GENERAL TRANSIT CO.,
C. W. Bryson
Manager

THOMAS WIGGLING—SHAKING—DUMPING GRATE BARS

PATENTED



BOTTOM AND END VIEW OF BAR
SHOWING STRUCTURE

Save their cost in fuel in a few weeks use.
Eliminate the cleaning period.
Eliminate grate bar mishaps and shut downs.

Make a poor steaming boiler, a free steamer.
Reduce the fireman's labors.
Cannot get out of fix and refuse to work.

THE WHY

STRUCTURE—Is made up of two curves, one top and one bottom, joined together at each side with spacing and connecting lugs of one-third contact and two-thirds air space, forming a structure in which the heat cannot equalize; the under portion cannot get hot to break or become distorted and refuse to work.

MATERIAL—Made of pure Pig Iron (no scrap) bought on analysis, standing 2370 degrees before fusing.

OPERATION—The Elliptic shape, eccentric movement slips under the fuel or fire bed, peels the ash from its lodgment and deposits into ash pit and does not disturb the fire, tearing the fuel bed into streaks, seams, holes and pockets, as other shaker grates do.

RESULTS—The fire is kept at the highest state of efficiency at all times—never fouling, giving more steam and substantial savings in fuel.

Sales Offices:

Hippodrome Building, Cleveland, Ohio
50 Broad St., New York
Railway Exchange Building, Chicago, Ill.
617 Bienville Street, New Orleans, La.

Digitized by Google

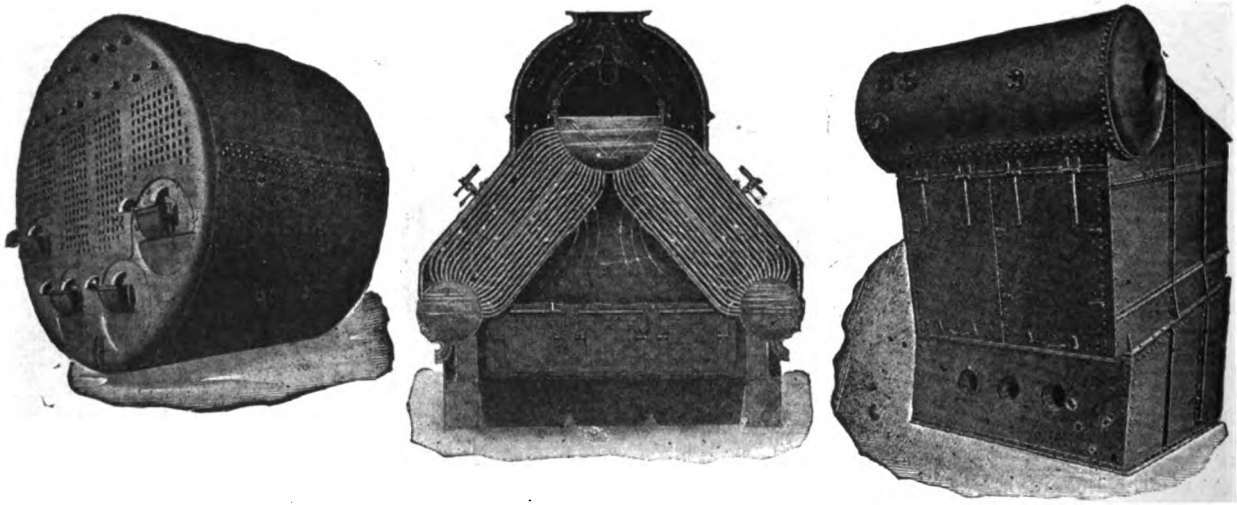
HEINE

MARINE BOILERS
MARINE SUPERHEATERS

HELIOS

HEINE SAFETY BOILER CO.
5325 MARCUS AVENUE, ST. LOUIS, MO.

WE SPECIALIZE IN THE BUILDING OF MARINE BOILERS



Our plant was specially designed and built for the construction of Marine Boilers. It is equipped with automatic tools, specifically designed for this work, which enables us to turn out better built boilers at a low cost and in the shortest possible time.

We can supply your wants, as we build.

Colven Express Water Tube Boilers
Empire Water Tube Boilers (Straight Tubes)
Scotch Marine Boilers

NEW YORK ENGINEERING COMPANY

2 Rector Street, New York City **Works at Yonkers, New York**

Digitized by Google

For over 30 years

"LAKE ERIE" SCOTCH MARINE BOILERS

have been the favorite with most of the largest shipbuilders in the country

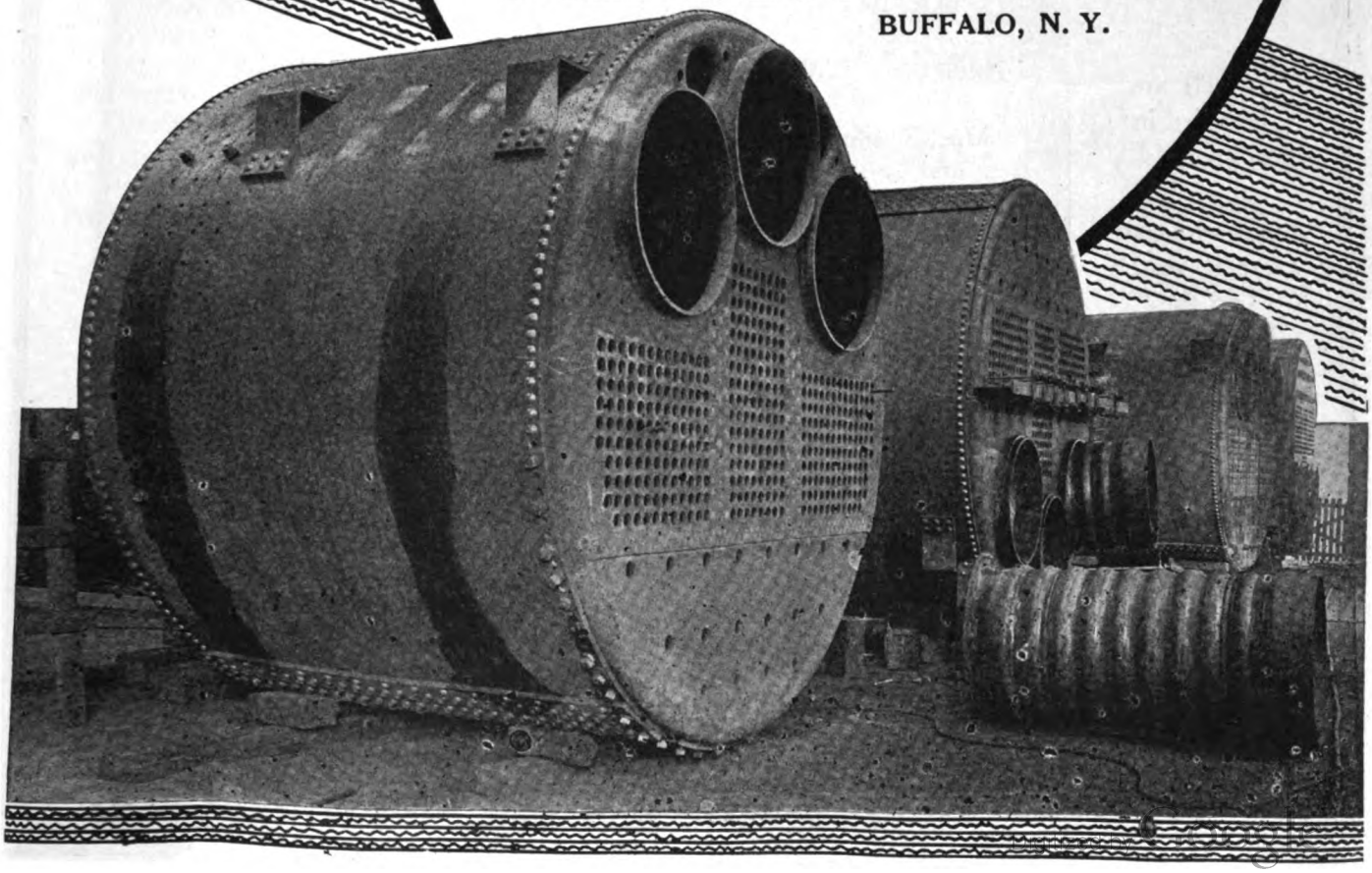
Used by

GREAT LAKES ENGINEERING WORKS, DETROIT.
BLISS DALLETT & CO., NEW YORK CITY.
W. & A. FLETCHER & CO., HOBOKEN, N. J.
MEXICAN PETROLEUM CORPORATION, NEW YORK CITY.
AMES SHIPBUILDING & DRY DOCK CO., SEATTLE.
AMERICAN SHIPBUILDING CO., CLEVELAND.
JOHN W. SULLIVAN CO., NEW YORK CITY,
and many others of national repute.

Approved by U. S. Inspectors; American Bureau of Shipping; U. S. Shipping Board Emergency Fleet Corp.; Lloyds.

Let us give you a figure on your next job.

LAKE ERIE BOILER WORKS
BUFFALO, N. Y.



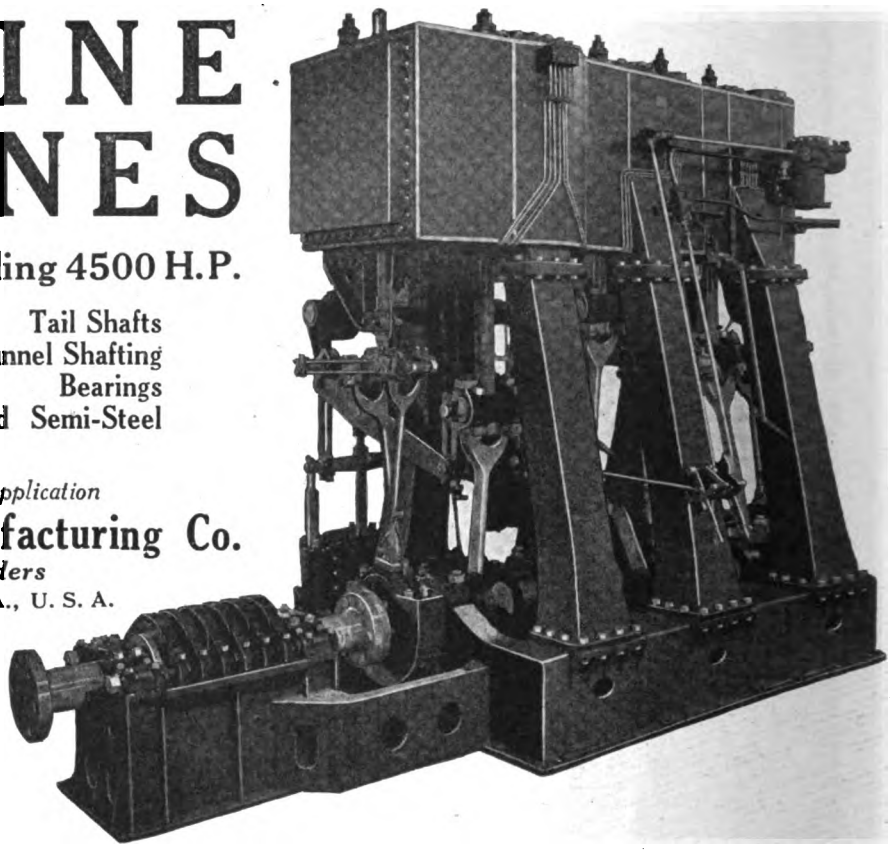
MARINE ENGINES

Sizes up to and including 4500 H.P.

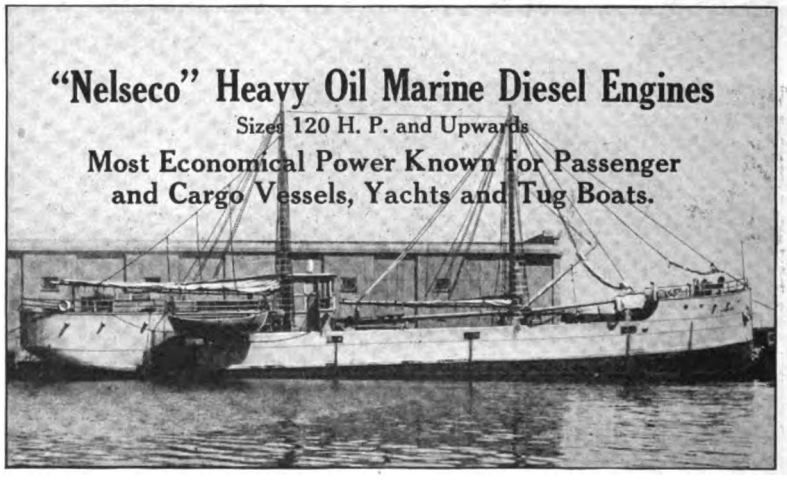
Stern Tubes Tail Shafts
Propellers Tunnel Shafting
Rudders Bearings
Heavy Gray Iron and Semi-Steel Castings.

Prices submitted on application

Hardie-Tynes Manufacturing Co.
Engine Builders
BIRMINGHAM, ALA., U. S. A.



"Nelseco" Diesels are installed in a steadily increasing number of commercial vessels on the Atlantic and Pacific Coasts.


"Nelseco" Heavy Oil Marine Diesel Engines
Sizes 120 H. P. and Upwards
Most Economical Power Known for Passenger and Cargo Vessels, Yachts and Tug Boats.

Reliability, service, low upkeep, and ready operation by average engineers are the result of the simple design and rugged construction of "Nelseco Diesels"

American built—to Lloyd's Rules

CARGO VESSEL "CERRITO"

Equipped with 240 H.P. Diesel Engine

New London Ship & Engine Company

Groton, Conn., U. S. A.

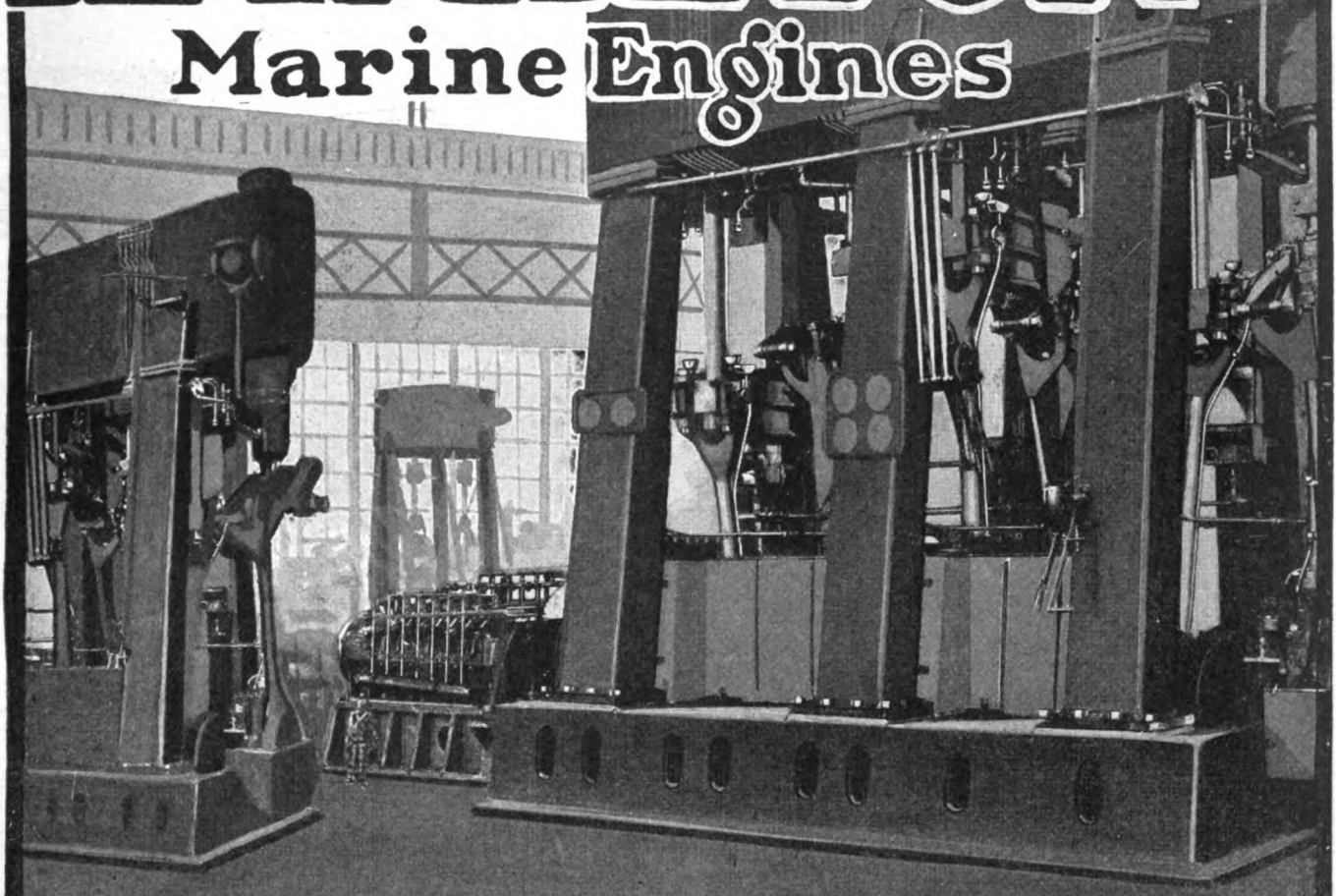
Pacific Coast Representative
1907 L. C. Smith Bldg.
San Francisco, Cal.

New England Representative
8 Irvington St.
Boston, Mass.

Digitized by Google

HAMILTON

Marine Engines



America's Merchant Marine

Yesterday it did not exist—today thanks to multiple production the great marine units necessary to solve the problems of the war—and to reach out for the world's commerce have been built.

The world wide trade opportunities that follow the war depend upon a merchant marine that can compete with all other shipping.

An essential factor in the development of this great commerce carrying fleet is the multiple production of marine engines.

And it is a matter of considerable pride to us that we are privileged to play a part in this important work.

We are building marine engines in sizes from 750 to 2800 horse power—which by the actual test of use have proved their efficiency, their economy and their thorough dependability.

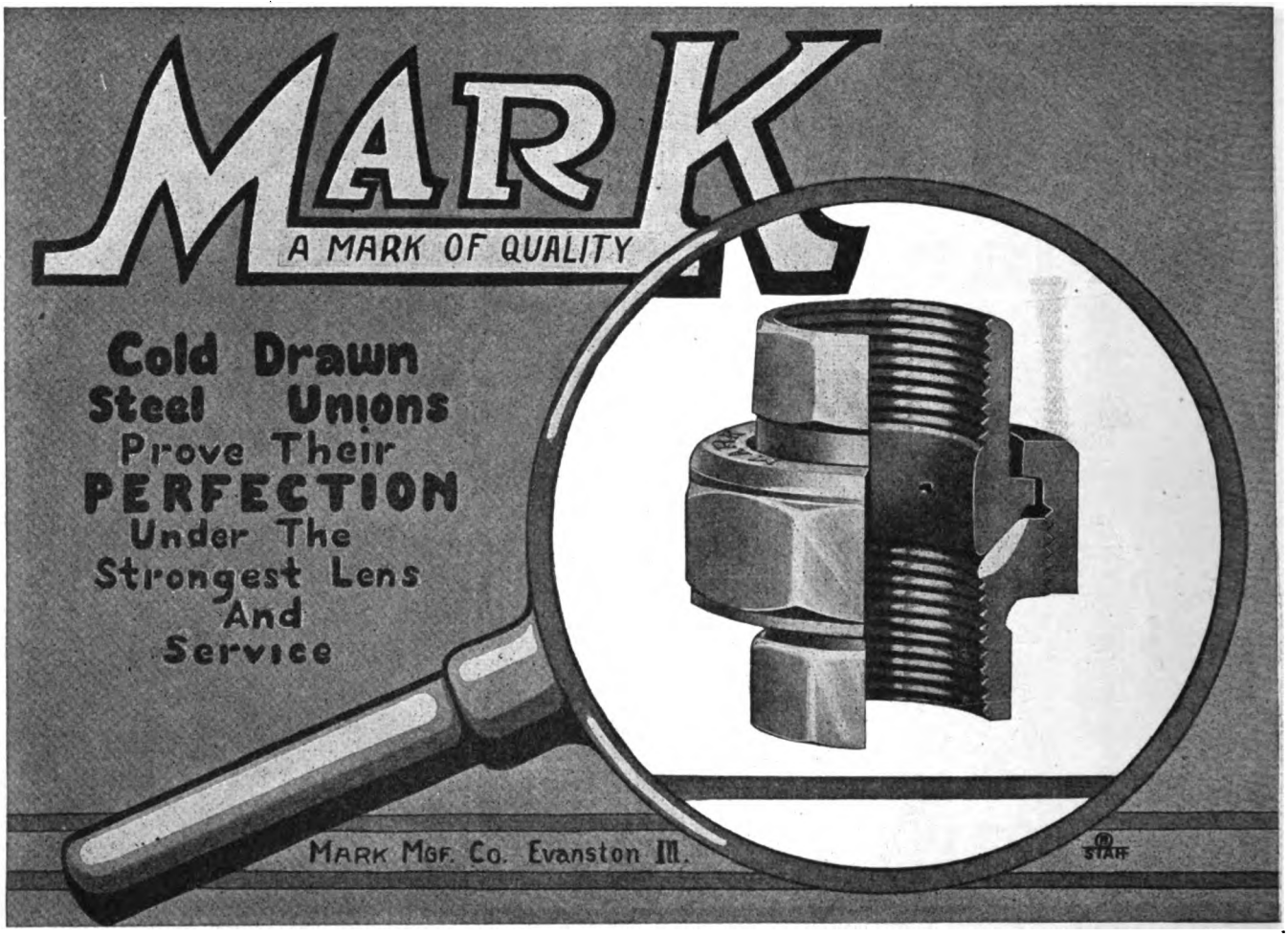
Write Us Your Requirements and We Will Be Glad to Furnish Quotations

THE HOOVEN, OWENS, RENTSCHLER COMPANY

Producers of Prime-Movers for All Industries
HAMILTON,

Offices Located In All Important Cities
OHIO. U. S. A

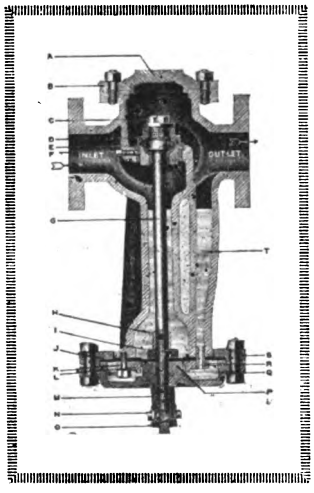
Digitized by Google



→ AULD ←

"QUITETITE"

This
Reducing Valve
is being used with most satisfactory results in Merchant Marine Service. Its efficiency and reliability have thoroughly proved it to be unsurpassed.



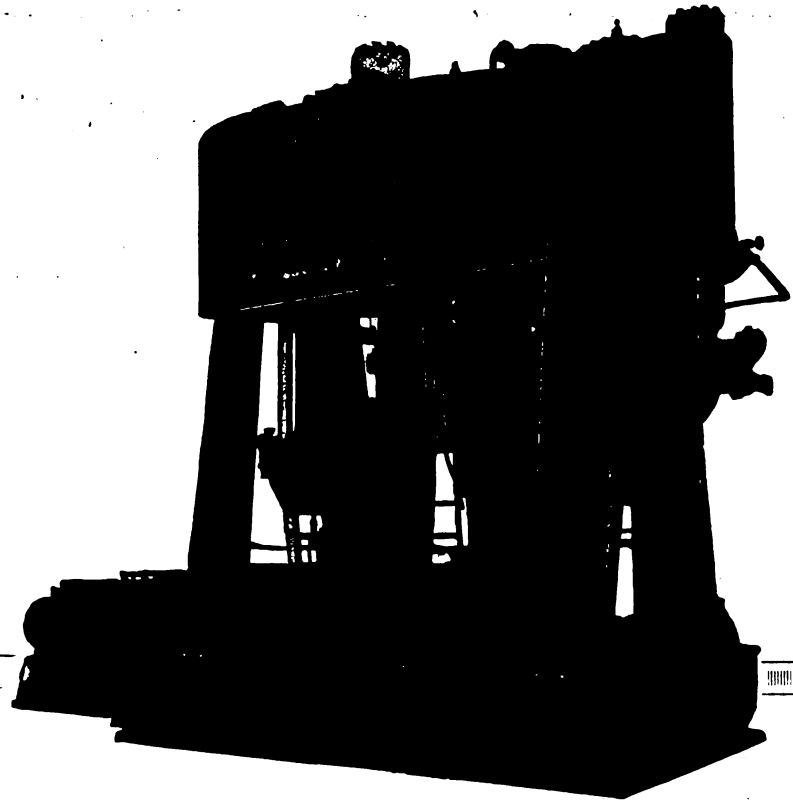
The
Auld Valve
is thoroughly guaranteed in every respect. We do not ask you to take a chance. Would you like to have us send you full details?

Then write for Catalog 8-R

Schutte & Koerting Co.

1152 THOMPSON ST. PHILADELPHIA, PA.

Digitized by Google



Traylor Marine Engines

mean Security when the Big Test comes, as well as in their steady, unfailing service, day after day and year after year with the minimum of attention.

We invite your inquiries on all types and sizes of

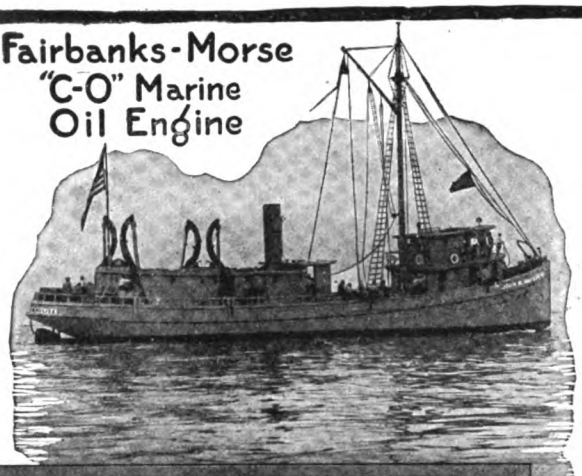
Marine Engines
Boilers Condensers Pumps
and
Ballast Tanks
for Tug Boats and Ships

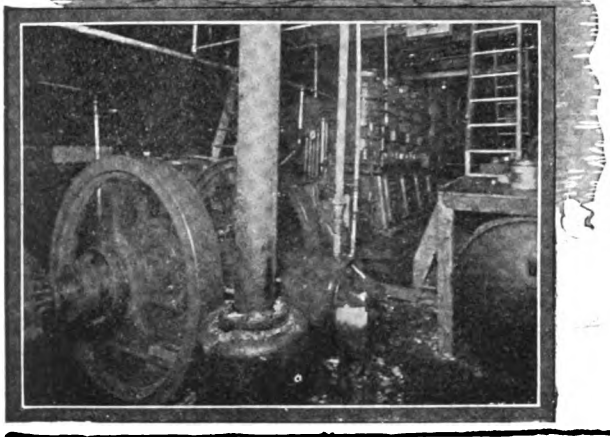
Traylor Engineering & Mfg. Co.

Allentown, Pa.

NEW YORK 30 Church St.		PITTSBURGH 211 Fulton Bldg.
CHICAGO 1414 Fisher Bldg.	LOS ANGELES Citizens Bank Bldg.	SPOKANE Mohawk Block

Digitized by Google





This Boat Pays

greater profits because it has an economical, dependable power plant. Its owners are men of broad experience, and they selected the Fairbanks-Morse "C-O" Marine Oil Engine—

—because it saves on fuel bills by using cheap fuel oil instead of expensive coal;
—saves help—requires no firemen;
—is simple, easy to understand and operate;
—has greater flexibility.

The many engines in successful operation confirm these facts daily.

Fairbanks, Morse & Co.
MANUFACTURERS CHICAGO

Engines - Pumps - Motors - Hoists - Air Compressors - Fairbanks Scales - Sheffield Motor Cars - Standpipes - Coaling Stations - Etc.

LARGEST MARINE BOILER HEADS IN THE WORLD
FLANGED IN ONE PIECE

Such work is possible because we have the World's Largest Plate Mill rolling flat circles up to 199 inches diameter.

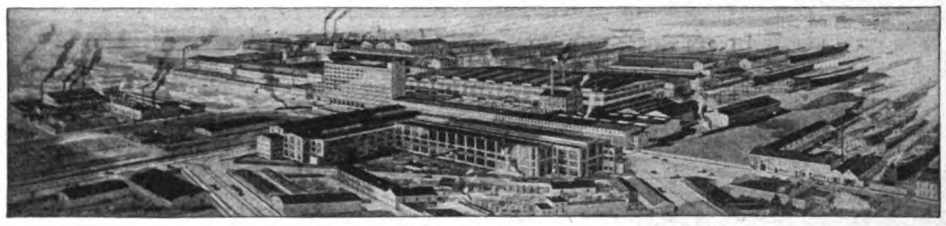
Then our spinning flanging machine flanges these flat circles in One Piece to 15 feet 3 inches O. D. with 11 inches overall depth of flange, metal 1⅛ inches thick.

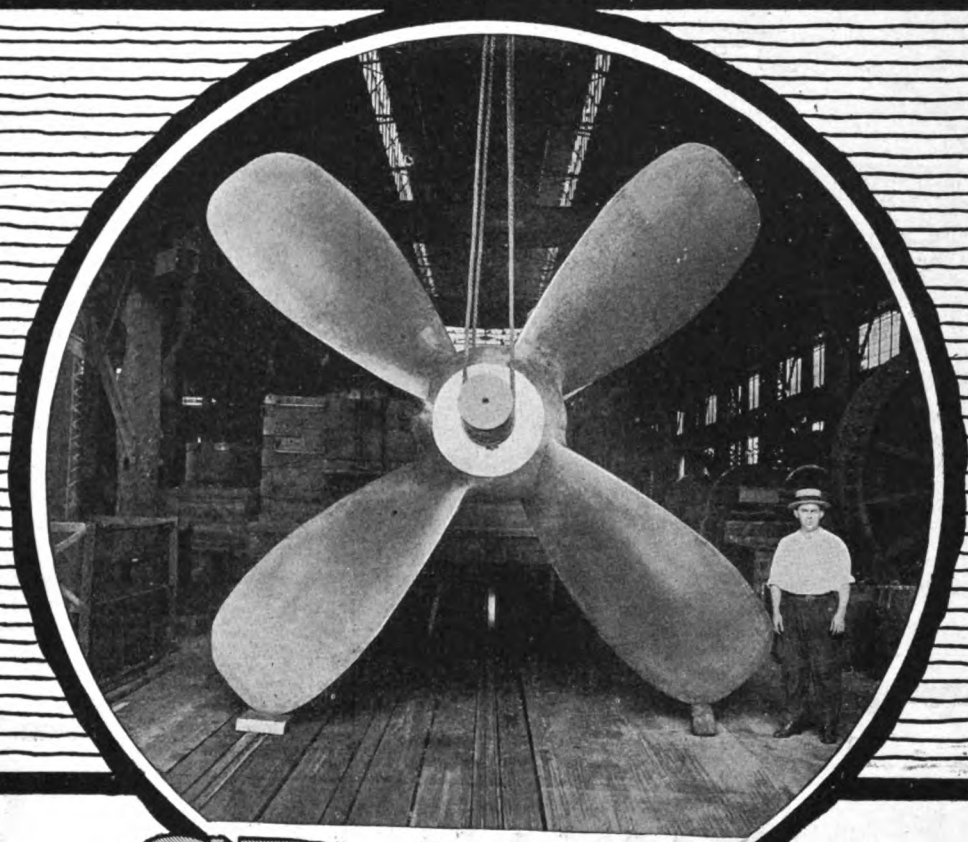
Design Your Boiler Heads in One Piece

LUKENS STEEL COMPANY
COATESVILLE, PA.

Consolidated Steel Corporation, 165 Broadway, New York City, our sole representative in export trade. Send all export inquiries to them.

Digitized by Google





CRAMP

The above is one of the many giant propellers furnished of Parsons' Manganese Bronze by Cramp's during the War. It is 16'-0" in diameter and has a pitch of 21'-6". In the rough it weighed about 25,000 pounds; when finished its weight was 20,800.

MARINE CASTINGS

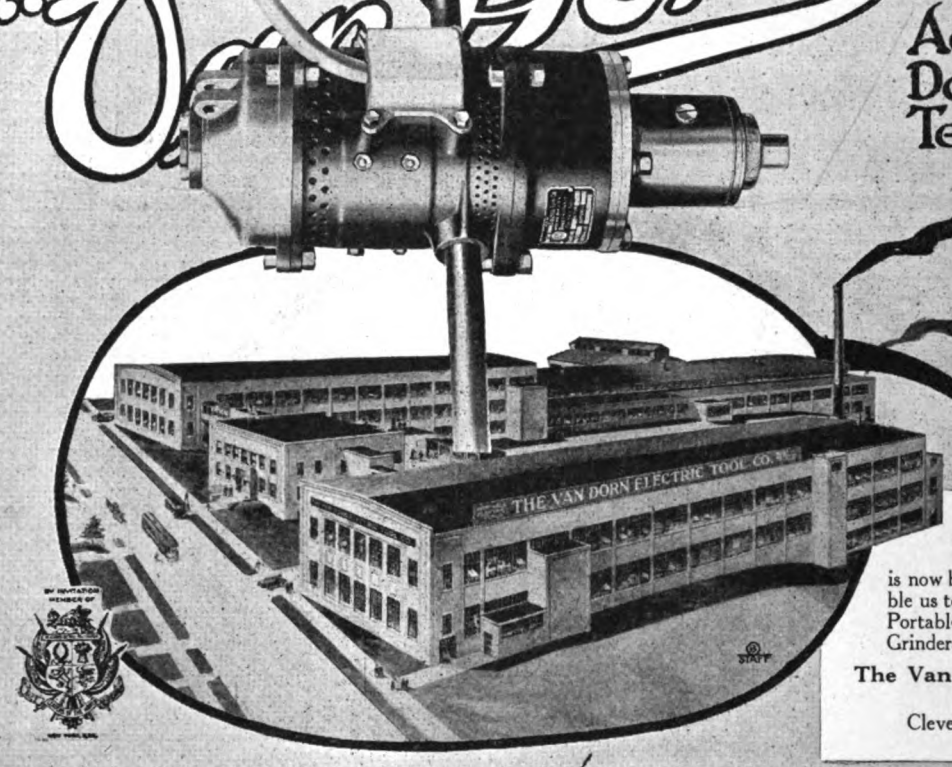
We can furnish and will be glad to estimate on all kinds of Brass and Bronze Castings for Marine Use, completed and ready for installation; or on the Ingots and rough castings as desired—Parsons' Manganese Bronze, all Government Compositions, Bearing Bronze, Hydraulic Bronze.

THE WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY :: PHILADELPHIA

Digitized by Google

"Van Dorn"

Actual Demand Tells

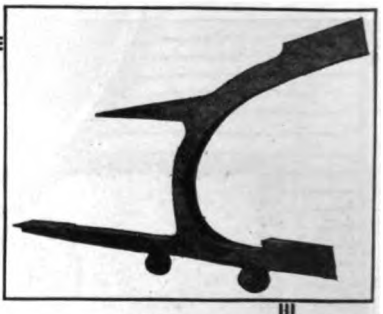


We have outgrown capacity to such an extent that an addition is now being built which will enable us to double our production of Portable Electric Drills and Grinders.

The Van Dorn Electric Tool Company
Cleveland, Ohio, U. S. A.

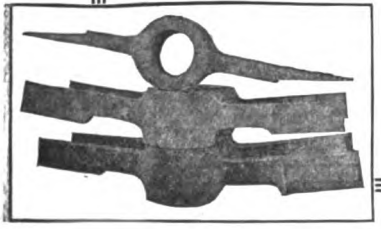
STEEL CASTINGS

OF EVERY DESCRIPTION



The outer illustrations show parts of a large Stern Frame Casting. The center illustration shows the castings assembled. All work having been performed at our plant.

Difficult work is our specialty. WRITE US.



National Foundry Company

ERIE, PA.

Digitized by Google

One Piece Rudders
Four Piece Stern Frames

Iron and Open Hearth Steel Castings
up to 100,000 pounds.

We also manufacture Rolls and Rolling Mill Equipment.

WHEELING MOLD & FOUNDRY CO.
WHEELING, W. VA.

Digitized by Google

TALK No. 5 **"PURE MANILA"**

This expression is of no more value than "Long Fibre" as a means of designating **quality in** Manila Rope, because of the many grades of "Pure Manila" Hemp produced.

As shown in our last advertisement there may be a variation in strength of more than 40% between intermediate grades of Manila; our comparisons did not include very low grade Manila Rope as against Bolt Rope.

"Highest grade" of "finest quality" hemp is actually used only for the manufacture of Yacht Rope or other specialties, and these terms are misleading if used to indicate the quality of fibre in any ordinary commercial grade of Manila Rope.

U. S. Government Specifications (Bureau of Standards) designate **quality of fibre** for good Manila Rope, and buyers should satisfy themselves first as to the grade of hemp guaranteed in any rope offered.

Whitlock ALL-Manila is warranted to exceed these specifications in quality of fibre as well as in yardage and breaking strength, and is recognized generally as—**"The Utmost in Rope Value".**

The Rope that Endures
WHITLOCK
ALL-MANILA

WHITLOCK CORDAGE COMPANY
Dept. B, 46 South Street, New York
Factory and Warehouses:
Jersey City, N. J.
Branches:
Chicago, Boston, Houston and Kansas City

IT IS NOT MERE CHANCE THAT HAS INDUCED ENGINEERS AND OWNERS TO INSTALL THOUSANDS OF

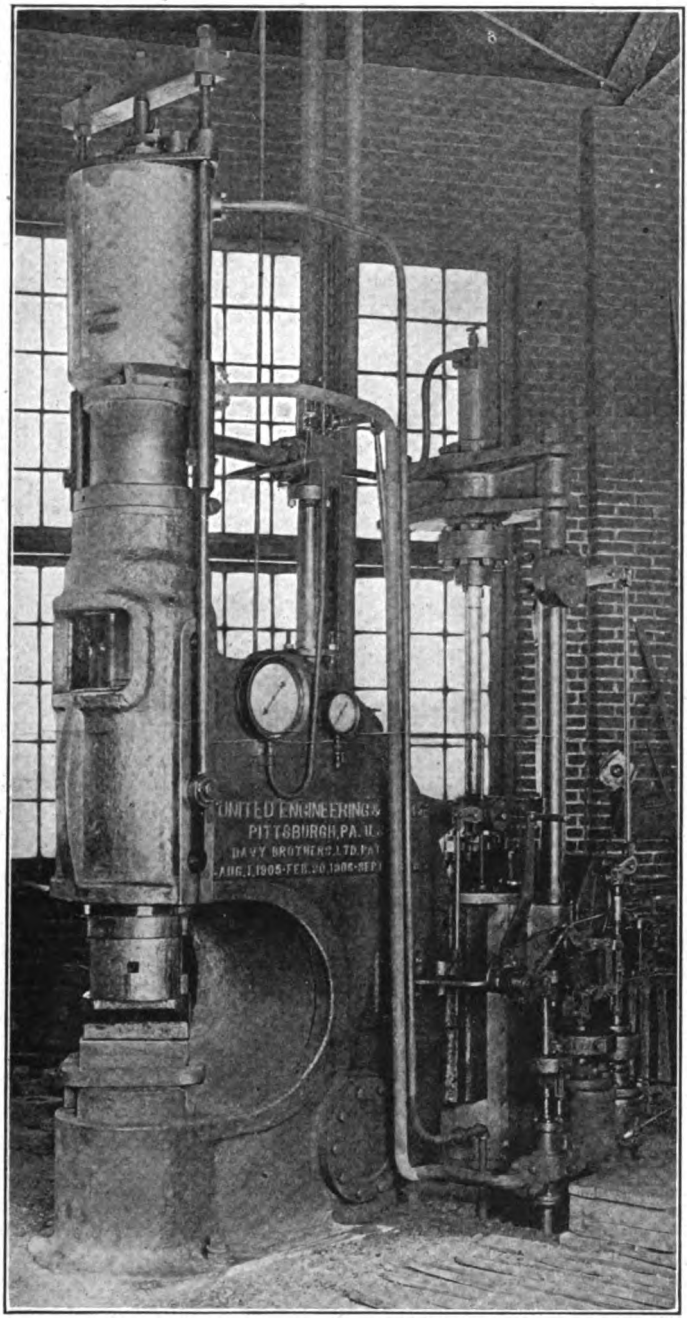
BRUNSWICK
ICE MACHINES

ON VESSELS ALL OVER THE WORLD—MARINE MEN DO NOT BUY THAT WAY. SERVICE, MECHANICAL AND PERSONAL, HAS MADE THEM A STANDARD.

BRUNSWICK REFRIGERATING CO.
800-850 JERSEY AVE.
NEW BRUNSWICK, N. J.

Digitized by Google

"UNITED" FORGING PRESSES



FOR

FORGING
SHEARING
PRESSING

SINGLE LEVER CONTROL

The press possesses many advantages over the hammer in its effect on the material, in the manipulation of the forging, in output and economy in working, and in the absence of noise and vibration.

Practically every large forge plant in the United States is now equipped with the United High-Speed Forging Press.

Single Frame, Overhanging Type
150 to 300 tons capacity

Four Column Type, Single Cylinder
500 to 1,500 tons capacity

Four Column Type, Duplex Cylinder
2,000 to 12,000 pounds capacity

Bulletin F may tell you something you wish to know about
UNITED FORGING PRESSES

UNITED ENGINEERING & FOUNDRY CO.

PITTSBURGH, PA.

The World's Greatest Manufacturers of Rolls and Rolling Mill Machinery

Digitized by Google

EQUIPMENT

For all classes of freight, passenger or towing vessels.

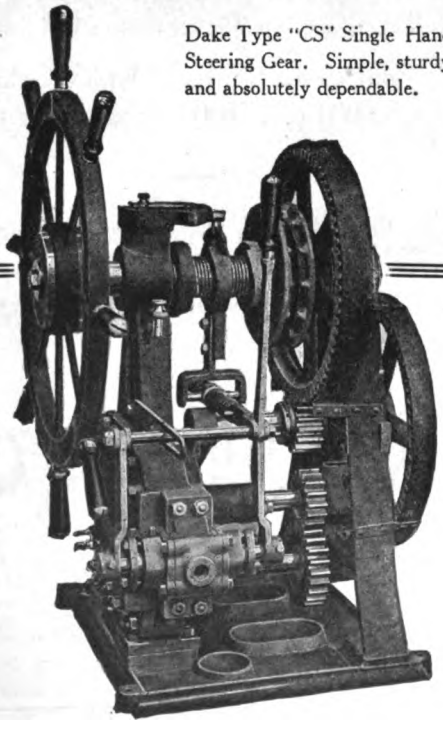
Steam Winches, Steering Gears, Electric or Steam Hoists, Deck Capstans, Capstan Windlasses, Blowers, Mooring Engines, Ash Hoists, etc.

Write for our latest Catalog.

DAKE ENGINE COMPANY

GRAND HAVEN, MICH.

New York: H. L. Drullard, 30 Church St.
Chicago: J. E. Chisholm & Co., Ltd., 741 Monadnock Bldg.



Dake Type "CS" Single Hand Steering Gear. Simple, sturdy and absolutely dependable.

Pop! -never fails

THE reliability of Lunkenheimer Pop Safety Valves has been demonstrated through many years of satisfactory service, on all types of boilers.

Rigid tests under live steam and their careful adjustment to meet the individual service conditions, is assurance that they will efficiently perform the functions for which they are intended.

Their remarkable durability, due to correct design and high "quality" materials, is a source of economy in many boiler plants.

Users KNOW. A trial CONVINCES.

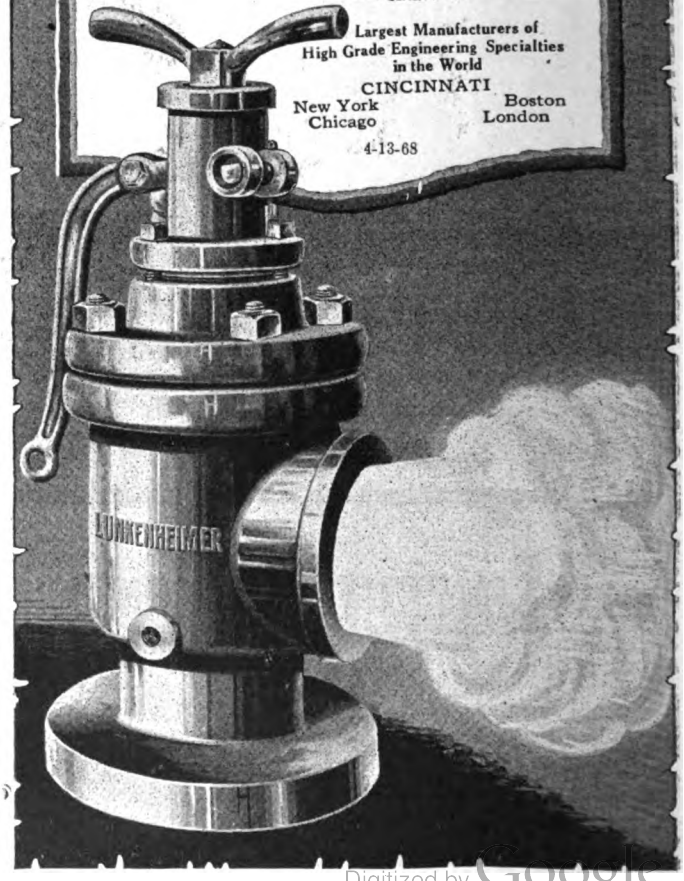
Write for booklet No. 502-FH.

THE LUNKENHEIMER CO.
"QUALITY"

Largest Manufacturers of High Grade Engineering Specialties in the World

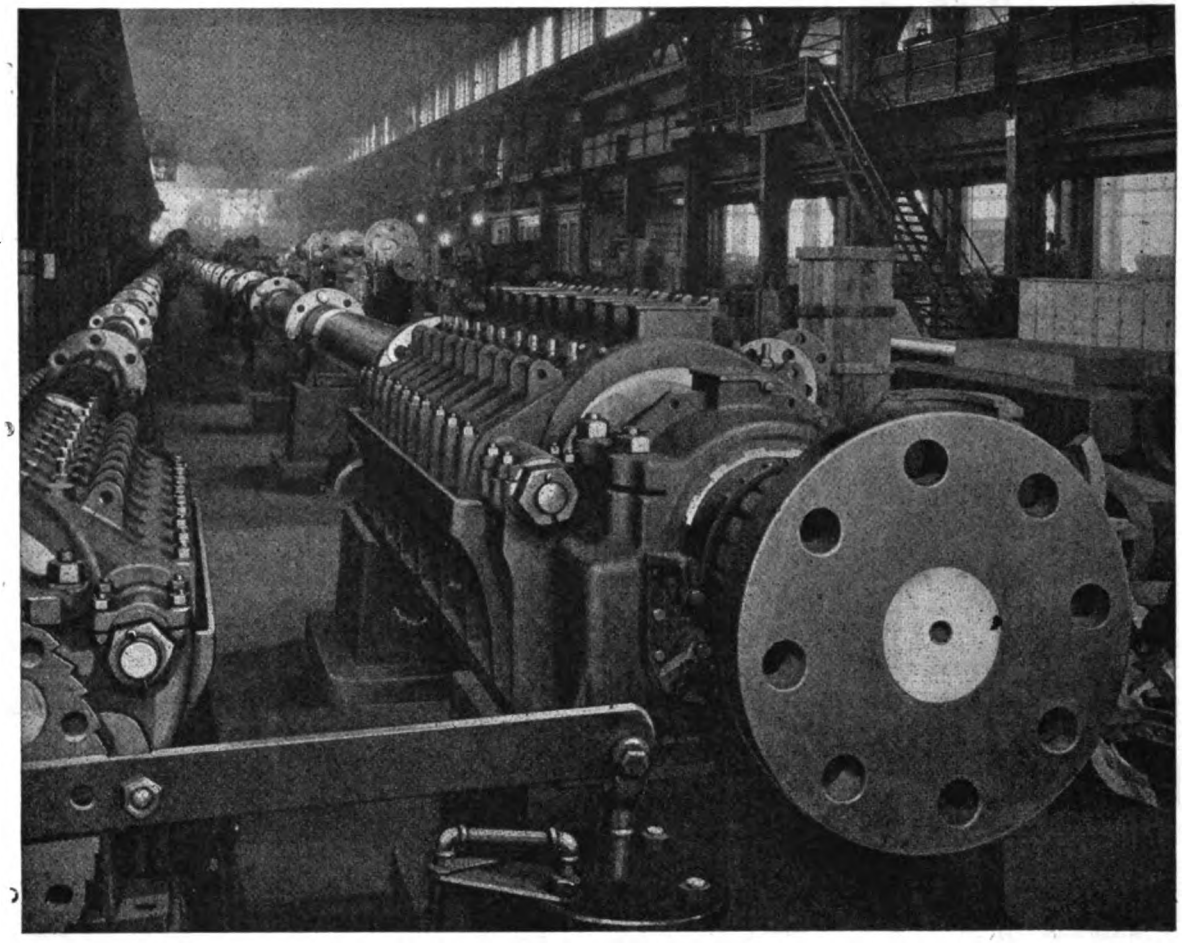
CINCINNATI
New York Boston
Chicago London

4-13-68



Digitized by Google

MESTA MARINE FORGINGS



VIEW IN SHIP SHAFT ASSEMBLING DEPARTMENT

We Specialize in Ship Shafting Either Rough Machined or Finished Complete

Thrust Blocks, Line Shaft Bearings, Stern Tubes, Stern Frames and Rudder Stocks

All **Shafting** made from acid Open Hearth Steel Ingots, forged under presses and carefully heat treated.
All **Steel Castings** made from acid Open Hearth Steel carefully annealed.
All **Iron Castings** made from Air Furnace Melted Iron of high tensile strength.

MESTA MACHINE COMPANY

PITTSBURGH **PENNSYLVANIA**

Manufacturers of

Gas and Steam Engines, Blowing Engines, Reversing Engines, Rolling Mill Machinery, Forging Presses, Gear Drives, Air Compressors, Condensers, Rolls, Pinions, Cut and Machine Molded Gears, Iron and Steel Castings, Forgings, Forging Ingots, etc.

Digitized by Google

Plain and Shoulder Patterns—17 sizes—¼ to 2½" diameter Shanks, Safe Working Load of 1/5 to 16 tons and ultimate strength of 1½ to 85 tons.

Williams' "Vulcan" Drop-Forged Eye Bolts

Proof-tested

It is often a question among marine engineers as to just what load a given Eye Bolt will carry. Owing to the fact that usually the manufacturers do not heat-treat and proof-test them, this is a very variable factor—one that it is practically impossible to forecast within even a very wide margin.

But in Williams' "Vulcan" Eye Bolts there is no question as to strength. Every forging is heat-treated to remove all strains which may have been developed in the metal and is then proof-tested in a standard tension machine to 50% *beyond* its catalog "Safe Working Load." All Eye Bolts, so tested are stamped O thus absolutely establishing their safety factor.

Tobin Bronze Eye Bolts from standard or special dies to order; inquiries solicited. Write for your copy of our new catalog.

J. H. Williams & Co.

"The Drop-Forging People"

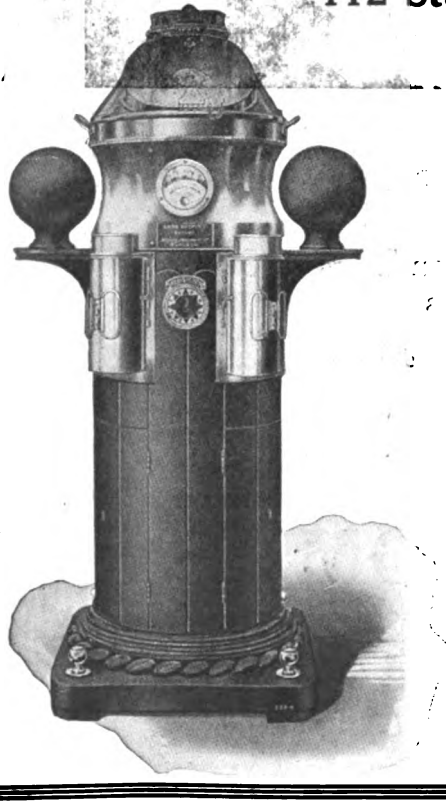
146 Richards Street, Brooklyn, N. Y.

146 So. Clinton St., Chicago, Ill.

140 Vulcan St., Buffalo, N. Y.

KELVIN & WILFRID O. WHITE CO.

112 State Street, BOSTON, MASS.



AMERICAN BRANCH OF

KELVIN, BOTTOMLEY & BAIRD, Ltd.

GLASGOW

Contractors for Navigational Equipment

The *Lord Kelvin* Standard Compass is the most dependable instrument in use today, is the finest made and guarantees more for the safety and quick passage of a ship than any other on the market, either magnetic or nonmagnetic—Write for our pamphlet on the reasons *Why* this is so—

Specify *"Genuine Lord Kelvin"* in your contracts—*The Best is None Too Good*—Goods now in Stock—Quick Deliveries.

We also manufacture in Boston *Liquid Compasses* of all kinds, *Sounding Machines, Peloruses,* etc., and can supply complete nautical outfits for any kind and size of vessel.

A Full supply of English *Sextants* on hand *Now* for immediate delivery.

Particulars on Application

Digitized by Google

REGISTERED H TRADE MARK

FORGINGS

REGISTERED H TRADE MARK

For

TURBINES AND SHIPS

Made of

Electric and Acid Steel

HEAT TREATED

Die Blocks Shear Knives

Heppenstall Forge & Knife Co.
Pittsburgh, Pennsylvania

Heppenstall Forge Company
Bridgeport, Connecticut

DISTRICT OFFICES:

Boston
200 Devonshire St.

New York
30 Church St.

Philadelphia
617 Bourse Bldg.

Cleveland
874 Rockefeller Bldg.

Detroit
West Grand Blvd. and West Jefferson Ave.

Chicago
722 Monadnock Blk.

Milwaukee
501 First National Bank Bldg.

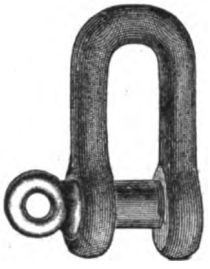
Syracuse, N. Y.
704 Keith Bldg.

Seattle, Wash.
Central Bldg.

Digitized by Google

SHACKLES

MHECO TRADE MARK



68,656 NOW IN STOCK

USE STANDARD GOODS

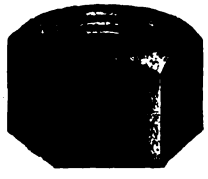
When you design your rigging, *don't* design *new fittings*. They *waste money* and they *waste time*. Have your designer write our engineering department for detailed specifications of

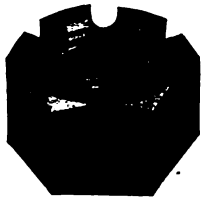
MHECO SHACKLES

STOCKED by MARINE HARDWARE JOBBERS

MANUFACTURED BY

MARINE HARDWARE-EQUIPMENT CO., So. Portland, Me.





"MILTON NUTS"

For Every Purpose

THE MILTON MANUFACTURING COMPANY

Milton, Pennsylvania

Digitized by Google

Digitized by Google

Inside Painting with Aeron

MAKES CERTAIN another source of increased production, as well as improved production.

EVERY advantage and economy that the Aeron spray-painting system makes possible on any one class of ship painting, is to be had in substantially the same degree on all other classes. This adaptability is a matter of record in those yards now using the Aeron for the complete painting job.

Painting the outside or inside of new or old ships; using anti-rust primer, non-corrosive, copper or lead paints, slushing compounds, varnishes or enamels, the results are the same.

The Aeron operator averages as much work as five hand-brushers. He applies a thorough, uniform and impervious protective coating—even on those places hard or impossible to reach with the brush. There is no costly replacing of brushes.

Aeron equipment is simple and dependable in construction, easy to operate, and inexpensive to keep up.

Write and let us mail you full particulars.

The DeVilbiss Mfg. Co.
1274 Dorr St. Toledo, Ohio

Aeron Painting System
Surpasses Brushing
Portable Painting Equipment
Sold on a strictly guaranteed-to-make-good basis

SUPERLATIVE CUTTING

Cutting a steel shaft head 18 inches in diameter in 6 minutes, cost of gas 38½ cents. The bigger the cutting job, the more marked is the superiority of the oxygen-hydrogen cutting flame. It slits through steel as a knife cuts butter.

Purest oxygen and hydrogen, in any quantity, at any time, at 44 service stations:

CALIFORNIA
California Burdett Oxygen Co., Los Angeles.
California Burdett Oxygen Co., Oakland.
COLORADO
Burdett Oxygen Co., Denver.
ILLINOIS
National Oxygen Co., Chicago.
Acme Oxygen Co., Chicago.
Burdett Oxygen & Hydrogen Co., Chicago.
Electrox Co., Peoria.
Swift & Co., Chicago.
INDIANA
Indiana Oxygen Co., Indianapolis.
Logansport Oxygen Co., Logansport.
IOWA
Bettendorf Oxygen Hydrogen Co., Bettendorf.
KENTUCKY
Kentucky Oxygen & Hydrogen Co., Louisville.
MICHIGAN
Michigan Ox-Hydric Co., Muskegon.
National Oxygen Co., Detroit.
Burdett Oxygen Co. of Detroit, Detroit.
MINNESOTA
Commercial Gas Co., Minneapolis.
MISSOURI
Oxygen Gas Co., Kansas City. (Two Plants in Kansas City)
St. Louis Oxygen Co., St. Louis.
MONTANA
Mountaineer Welders Supply Co., Butte.
NEBRASKA
The Balbach Co., Omaha.
NEW YORK
Standard Oxygen Co., New York City.
International Oxygen Co., College Point, L. I.
NEW JERSEY
International Oxygen Co., Newark.
Standard Oxygen Co., Hoboken.
OHIO
Burdett Oxygen Co. of Cleveland, Cleveland.
Ohio Chemical & Mfg. Co., Cleveland.
Dayton Oxygen & Hydrogen Products Co., Dayton.
Ohio Electrolytic Oxygen Co., Cincinnati.
Clarke Chemical Co., Wickliffe.
OKLAHOMA
Burdett Oxygen Co. of Oklahoma, Oklahoma City.
OREGON
Portland Oxygen & Hydrogen Co., Portland.
PENNSYLVANIA
International Oxygen Co., Verona.

Burdett Oxygen Co., Philadelphia. (Plants at Chester and Norristown.)
Burdett Oxygen & Hydrogen Co., Pittsburgh.
National Oxygen Co., Erie.
TENNESSEE
Burdett Oxygen Co., Chattanooga.
TEXAS
Burdett Oxygen Co. of Texas, Fort Worth.
Magnolia Gas Products Co., Houston.
UTAH
Whitmore Oxygen Co., Salt Lake City.
Utah Burdett Oxygen Co., Salt Lake City.
WASHINGTON
Washington Burdett Oxygen Co., Seattle.
WISCONSIN
Universal Oxygen Co., Sheboygan.
BRITISH COLUMBIA
Compressed Gas Co., Ltd., Vancouver.

Gas Products Association
801 Marquette Bldg. Chicago, Ill.

Digitized by Google

AMERICAN BUREAU OF SHIPPING

INCORPORATED 1862

STANDARD AMERICAN CLASSIFICATION OF SHIPPING

Stevenson Taylor, President

Vice-Presidents

ELLSWORTH P. BERTHOLF
CHARLES A. McALLISTER
ANTONIO C. PESSANO
FRANK GAIR MACOMBER
WILLIAM H. TODD
LOUIS F. BURKE

Sec'y and Treas.

JOHN W. CANTILLION

GREAT LAKES DEPARTMENT

(*Formerly Great Lakes Register*)

Great Lakes Department

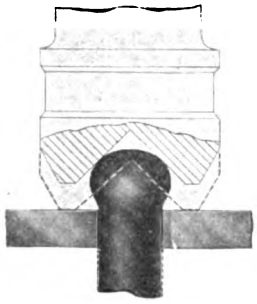
H. N. Herriman, Manager

Rockefeller Bldg., Cleveland, Ohio

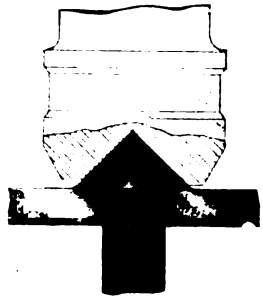
This bureau supervises the construction of vessels throughout under established rules—tests all materials for hulls, machinery and boilers, and proof tests all anchors and chains, etc. Classification of a vessel is a standard for builders and owners and the certificate is an authority for underwriters and shippers.

TIGHT SHIP RIVETS

One head of an American Rivet is partly formed in manufacture.
It is finished in the driving.
This insures an absolutely tight rivet.
And the hole is filled at BOTH ENDS.



Both ends are tight on an American rivet. On the partly formed head the metal flows into the hole and over the sheet during driving.



With an ordinary rivet with the head already formed the metal can only squeeze out on the sheet. The hole is never filled.

American Flexible Bolt Company

50 Church Street, New York — McCormick Bldg., Chicago — Union Bank Bldg., Pittsburgh, Pa.
Montreal — Winnipeg — Cleveland

NEW Cleveland POCKET-IN-HEAD Riveter

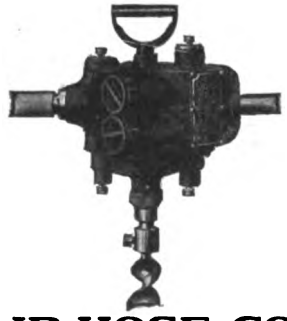
CLEVELAND RIVETING HAMMERS
FOR SHIP YARDS AND DOCKS

The New Cleveland is shorter, hits a harder blow and uses less air in operation than any Riveting Hammer on the market: 33⅓% gain in efficiency.

The new Cleveland is an "Ideal" Riveter for Ship Yards, Boiler Shops, Structural Work, Etc. The high speed and great power obtained through the Pocket-in-Head makes the New Cleveland a profitable investment. Capacity ¼-inch to 1½-inch Rivets.

CLEVELAND WOOD-BORING & STEEL DRILLING MACHINES
For Wood or Steel Cargo Ships

The No. 20W Wood-Boring Machine illustrated is well adapted for Ship Construction as it is "fast" and easily Handled by one man. Made in three Sizes, Nos. 10W, 20W and 30W, with boring Capacities ¼-in. to 4-in. in Wood. Shipped on Approval.



The No. 20TC steel drilling Machine is a light weight, high speed compound with a capacity of 1¼-in. boring and ⅞-in. Reaming in steel. It is a very compact, one man machine. We make 28 Types of Air Drills for all classes of work.

BOWES AIR HOSE COUPLINGS
Standard Equipment Everywhere

Instantly connected or disconnected. Absolutely air tight

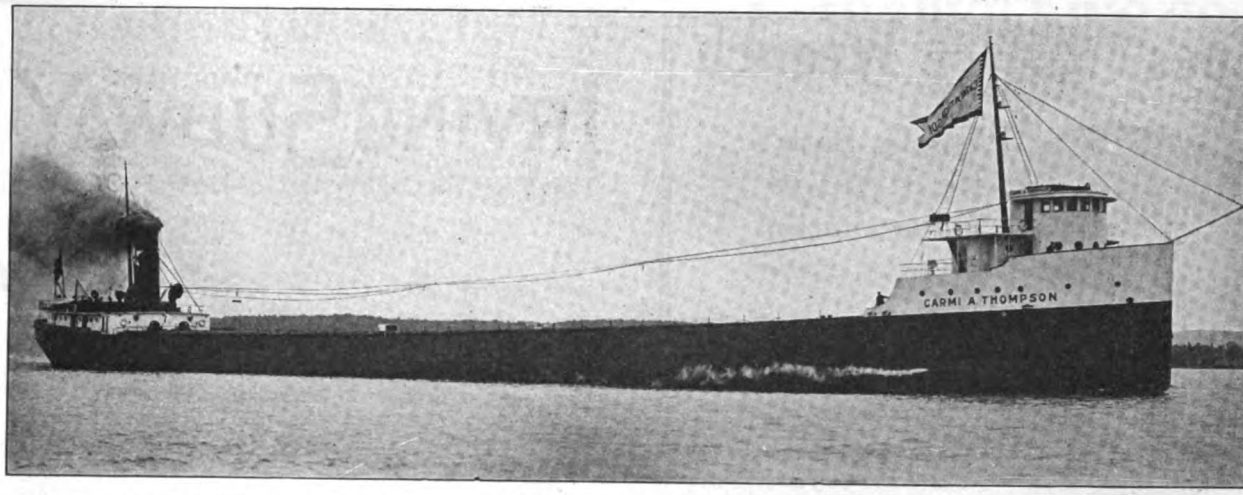
Interchangeable in all sizes most commonly used from ¼-in. to ¾-in.

Write for Bulletins Nos. 34A, 41, 42, 43

THE CLEVELAND PNEUMATIC TOOL COMPANY

NEW YORK, PHILADELPHIA, 84 Chestnut St., Toronto, Ont. — MAIN OFFICES AND WORKS, CLEVELAND, OHIO — BOSTON, PITTSBURGH, CLEVELAND PNEUMATIC TOOL CO., OF CANADA, LTD. — CHICAGO, SAN FRANCISCO, 337 Craig St., W. Montreal, Que.

Digitized by Google



S. S. Carmi A. Thompson built on the ISHERWOOD SYSTEM by the American Shipbuilding Co. Added length without increase of beam has increased the cargo carrying capacity without materially increasing weight of Hull.

ISHERWOOD SYSTEM

No. of Ships Built, under Construction or on Order at the

1st Jan., 1917.
620, aggregating 4,676,000 tons deadweight carrying capacity.

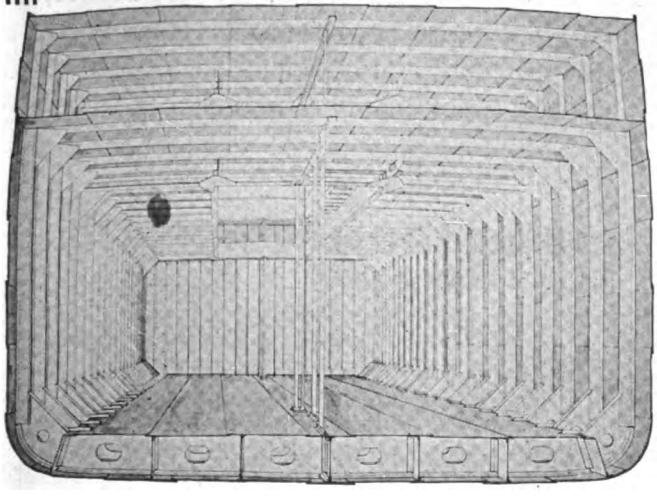
1st Jan., 1918.
800, aggregating 6,000,000 tons deadweight carrying capacity.

1st Jan., 1919.
1200, aggregating 9,500,000 tons deadweight carrying capacity. This figure includes 400 oil tankers, aggregating 3,660,000 tons deadweight carrying capacity.

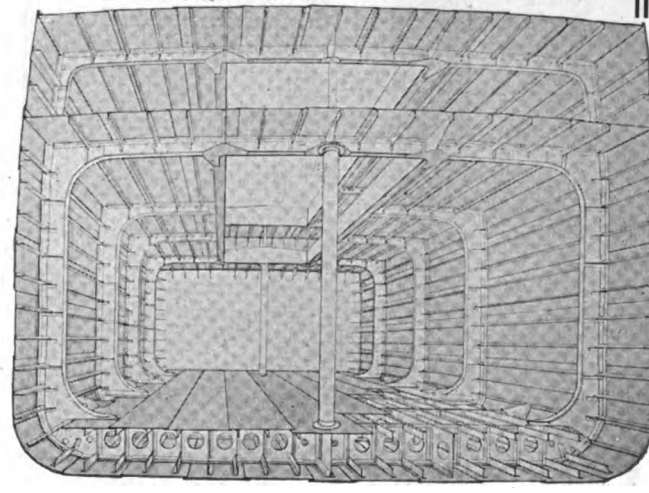
And yet there are still Owners who have not considered the advantages of the System.

J. W. ISHERWOOD, 17 Battery Place, New York, U. S. A.

And at 4 LLOYD'S AVENUE, LONDON, E. C. 3



THE OLD WAY

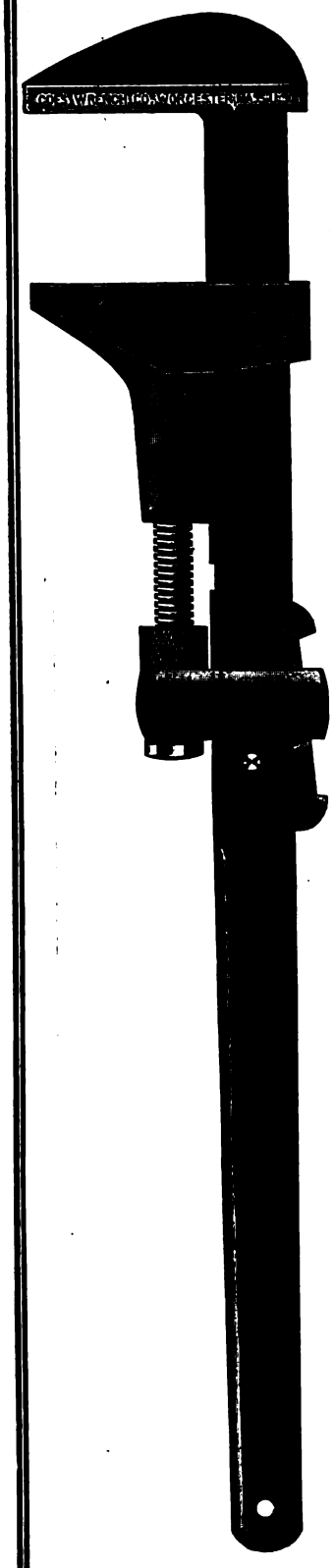


THE ISHERWOOD SYSTEM

"GENUINE"

Coes KEY MODEL Wrench

TRADE-MARK REG U S PAT OFF



Uncle Sam's First Aid in Construction

Made in 28"-36"-48".

This wrench was designed to fill the gap between the *21-inch* and the heavy *spanner wrench* for large work. It will not *batter* and *jam* a large *nut* as will a *chain* wrench. It will not slip or make trouble and will take anything within its opening capacity, no matter whether square or hexagon.

Made of heavy steel *forgings*, fully hardened, and each wrench tested before shipping, to assure freedom from flaws.

In the Key wrench we have the finest *engine room tool* ever made. It is self contained.

The key cannot come off, and the two positions for *jaw straps* assure its going into corners without trouble.

The wrench is hardened by a special process, used by Mr. Coes for many years and this process, like all the other things about this line, is the result of long and earnest experiment.

Warranted free from mechanical defects. Patented and registered. Each wrench stamped with maker's name, etc.

28" opens 5¼", weighs 19 lbs.
36" opens 6¼", weighs 28 lbs.
48" opens 9½", weighs 62 lbs.

Ask Your Jobber

Coes Wrench Company

WORCESTER, MASSACHUSETTS, U. S. A.

IRVING SUBWAY
THE FIREPROOF VENTILATING FLOORING

IRVING SUBWAY

TRADE MARK
(PATENTED) REG.U.S.PAT.OFF.
THE FIREPROOF VENTILATING FLOORING

Why buy ship grating outside?

For the matter of that, why buy **anything** outside—engines, boilers, blowers, anchors, for instance?

Simply because engines, boilers, etc., made **by specialists** are **made better and at less cost** than you could make them.

Same way with grating—**made as a specialty by grating specialists, it's made better and at less cost.**

We were the first specialists in gratings—we make more gratings today than any one else.

That means **quantity production, better quality, lower price.** Why not put your grating specifications up to grating specialists—which means, to us?

Catalog 2 A 12?

IRVING IRON WORKS CO.

LONG ISLAND CITY, N.Y., U.S.A.

Manufacturers Also of

IRVING SAFSTEP

TRADE MARK
(PATENTED) REG.U.S.PAT.OFF.
ABSOLUTELY NON-SLIPPING ALWAYS

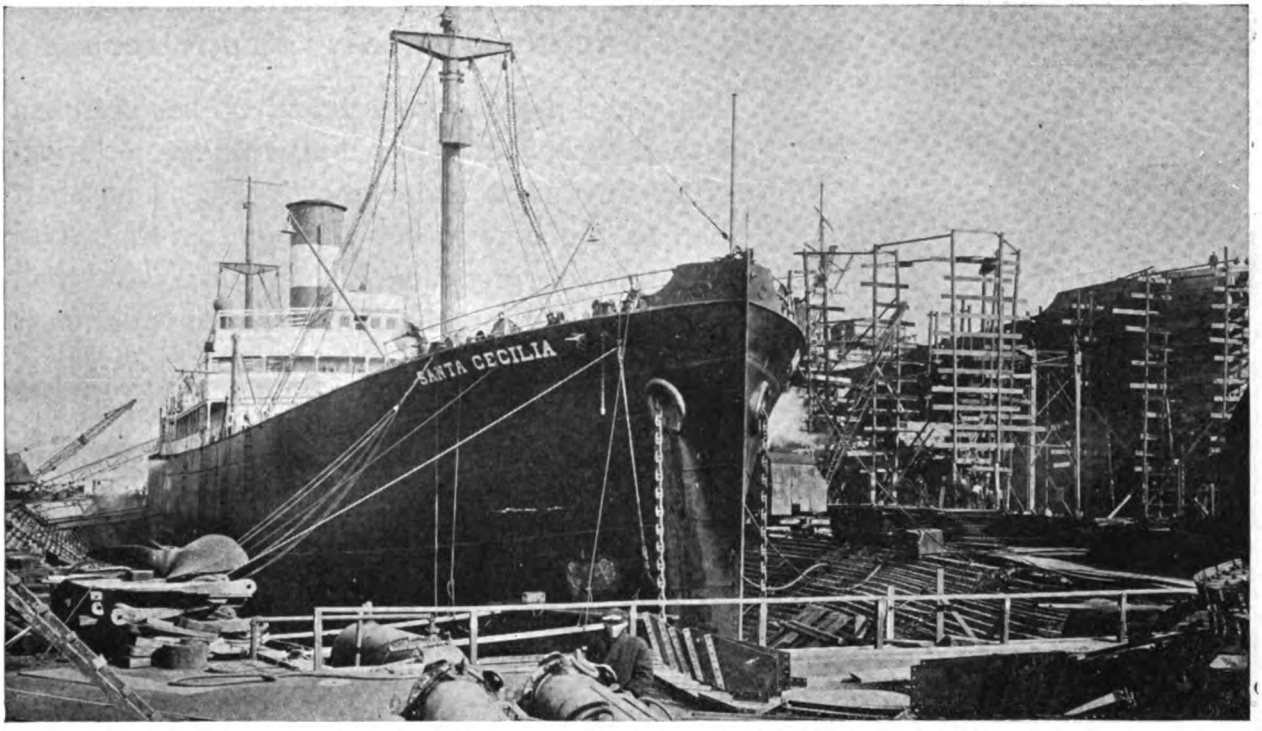
Digitized by Google

THE BALTIMORE DRY DOCKS & SHIP BUILDING CO.

HOLDEN A. EVANS
President

BALTIMORE, MD., U. S. A.
CABLE ADDRESS—"BALTODOCKS"

J. M. WILLIS
Vice Pres. and Gen. Mgr.



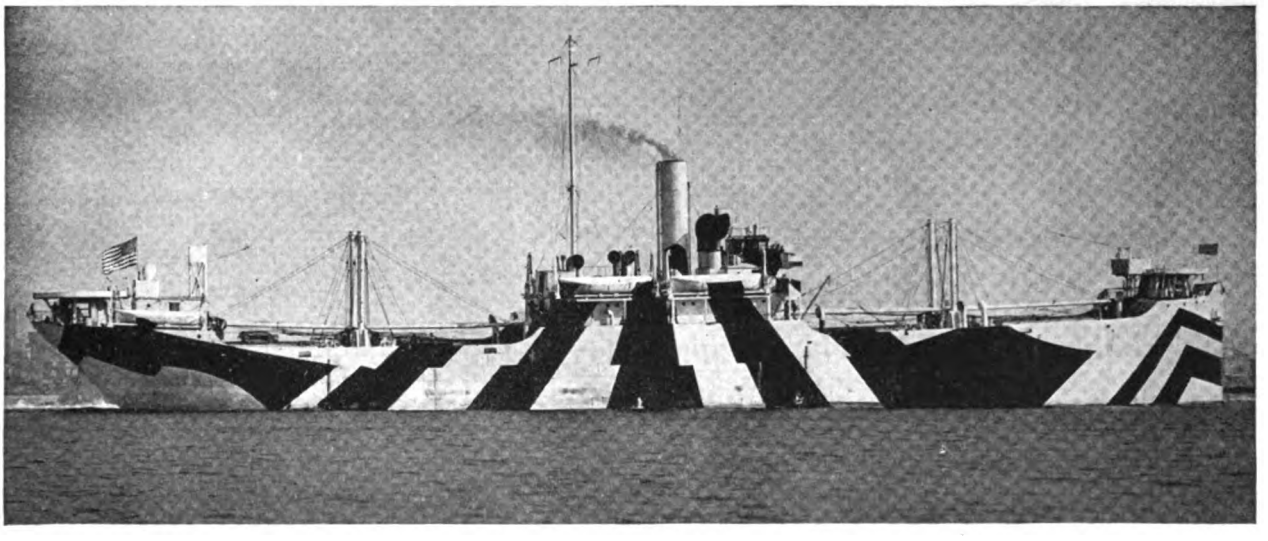
S. S. "Santa Cecilia" Undergoing Repairs in our lower Dry Dock

SHIP REPAIRS

Unsurpassed Facilities for Speedy Repairs of All Kinds

A contract placed with us means a force of skilled workmen and the most modern equipment at your disposal, assuring the **Best Work** in the **Shortest Time** at **Moderate Cost.**

Builders of Steel Cargo Ships, Oil Tankers, Barges, Tugs

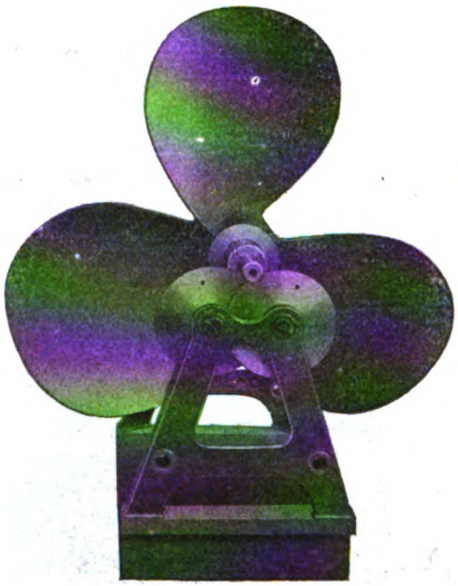


S. S. "Polar Land," Built by The Baltimore Dry Docks & Ship Building Co.

New York Office, 120 Broadway—Phone, Rector 5945

Digitized by Google

Perfect Propeller Wheel



This illustrates the method of balancing
Thacher Process Propellers

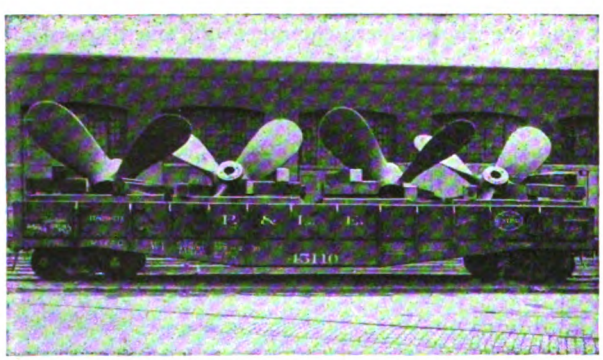
This wheel is a rough casting and has not been touched except for boring, but will remain stationary at any point under above test. The shaft fitted to the bore in hub rides on four discs, two each side of propeller. These discs have ball bearing journals so that any balance variation is immediately determined. It proves THACHER wheels are perfect in balance.

Write for the booklets
"Thacher Process Propellers"
"Efficiency in the Screw Propeller"

THACHER PROPELLER & FOUNDRY CORP.

Main Office and Works: Learned St., Albany, N. Y.
Owners of
AMERICAN SCREW PROPELLER CO., of PHILADELPHIA

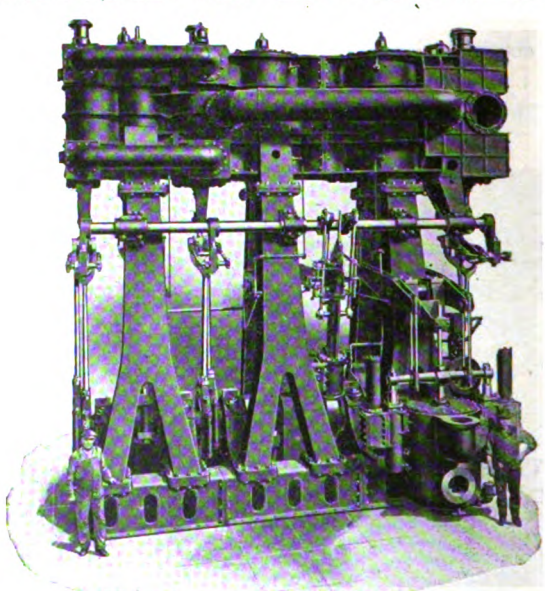
PROPELLERS



A Typical Load of 17' Diameter Propellers

SOLID AND SECTIONAL
SEMI-STEEL
and
MANGANESE BRONZE

MARINE ENGINES



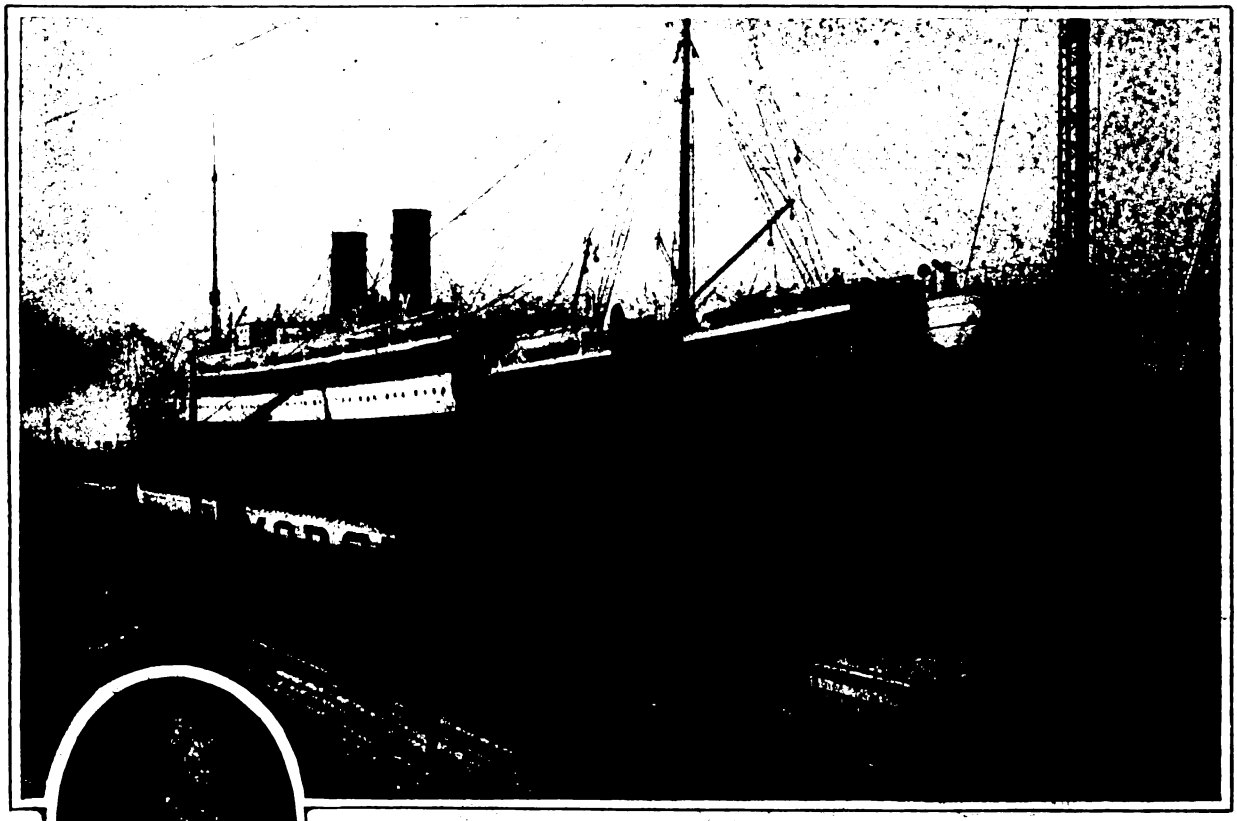
Triple Expansion—26½" and 44" and 74 by 51" stroke
One of Twelve Built for Texas Steamship Co.

H. G. TROUT COMPANY

BUFFALO, N. Y. **U. S. A.**

Digitized by Google

This is the LARGEST FLOATING DRY DOCK in the WORLD



Edward P Morse

Ships of 30,000 Gross Tonnage and 725 feet in length can be raised at the rate of one foot a minute

Our other dry dock will accommodate vessels of 15,000 tons. We have our own Heavy Forge Shop for handling iron, steel and alloy forgings up to 70,000 lbs.

An efficient, reliable fleet of ocean going tugs, ice breakers, dredges and other special harbor craft is at your disposal. Our acetylene and electric welding barges, lighters and floating machine shops are operated by skilled mechanics. Modern machinery and ample crane facilities.

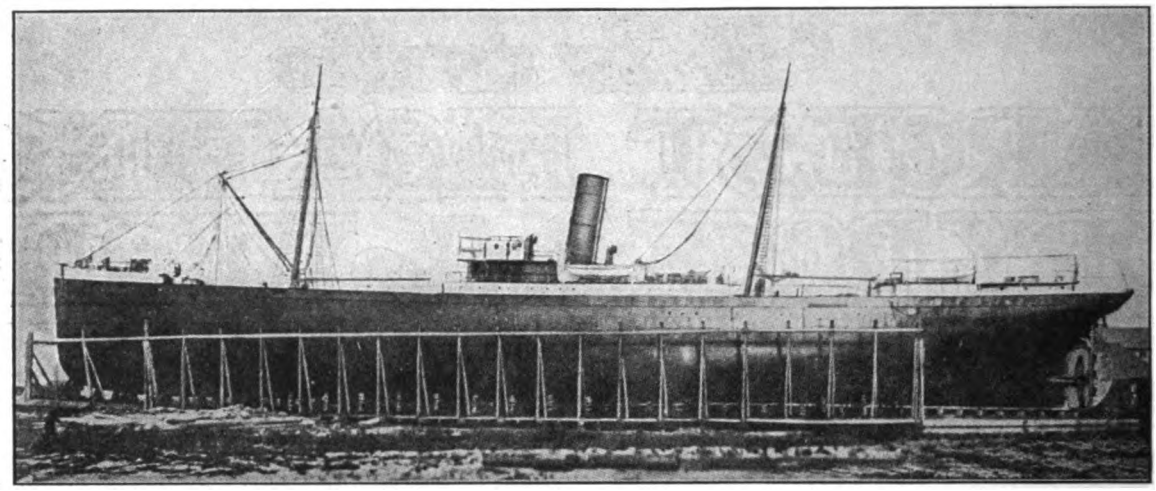
Boiler-making and repairing, pipe fitting, pipe covering, plumbing, electrical work, copper smithing, sheet metal work, machinists, complete wood working departments, painting, wood caulking.

MORSE DRY DOCK & REPAIR Co.

Telephone Sunset 5100

Foot of 54 to 57 Str's, Brooklyn, N.Y. Cable address: Pyrosuson, N.Y.

Digitized by Google



THE CRANDALL ENGINEERING COMPANY
DRY DOCK ENGINEERS
CONSULTING CONTRACTING
RAILWAY DRY DOCKS
FLOATING DRY DOCKS
102 Border Street East Boston, Mass.

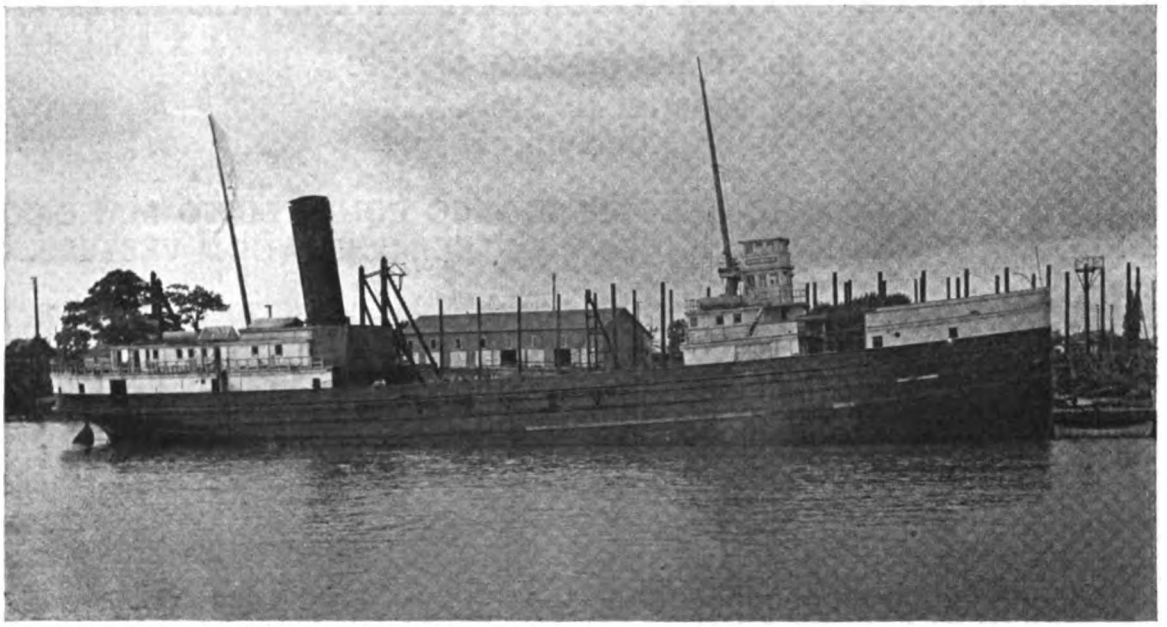
LAUNCHING GREASE PARAGON LAUNCHING STEARINE

A
REMARKABLE
RECORD OF
EFFICIENCY
SUCCESSFULLY USED AND ENDORSED
by over half the yards on the Atlantic and Gulf Coasts
building for the U. S. Shipping Board E. F. C.
ECONOMICAL
FIRST COST LOW—CAN BE RECOVERED
and used again without impairing
its efficiency

Write for particulars

BORNE, SCRYMSER COMPANY
80 South Street, NEW YORK
BOSTON, 36 Central Wharf PHILADELPHIA, 437 Chestnut Street

Digitized by Google



Photograph showing Str. "Lakewood" lying at our lower wharf after being cut in two and shortened to canal size by taking about twenty-three feet out of her midship section.

The Str. "Lakeport" which is nearly a sister ship to the "Lakewood" is now in our drydock undergoing the same change, having been towed to our yard from Cleveland for this purpose.

THE FOUNDATION COMPANY

PORT HURON SHIP YARD, Inc.

Port Huron, Mich.

DRY DOCK

GENERAL REPAIRS—WOOD AND STEEL
ELECTRIC AND ACETYLENE WELDING

Fully Equipped for New Work

Digitized by Google

ALABAMA DRY DOCK & SHIPBUILDING CO.

PLANT AND GENERAL OFFICES
MOBILE, ALA., U. S. A.
CODE WORD "DRY DOCK"

THE ONLY PLANT ON THE GULF OF MEXICO EQUIPPED TO MAKE COMPLETE REPAIRS IN ALL LINES TO STEEL AND WOOD VESSELS.

NOW OPERATING SEVEN DRY DOCKS, MAXIMUM CAPACITY 10,000 TONS

SHIPBUILDING
STEEL
WOOD

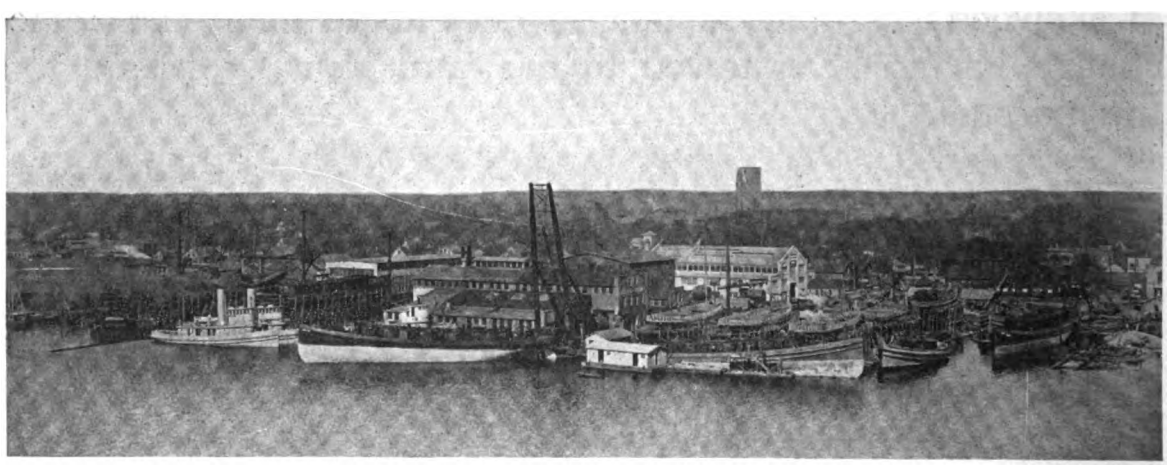
SHIP REPAIRS
ALL
CLASSES

ENGINEERS
ENGINE BUILDERS
BOILER MAKERS
PLUMBERS

FOUNDERS
MACHINISTS
ELECTRICIANS
SHIP CARPENTERS

HEAVY FORGINGS

New 10,000 Ton Dry Dock Now in Operation



We are prepared to build

STEEL CARGO VESSELS

Steel or Wood Tugs or Trawlers
Our Specialty

Inquiries invited.

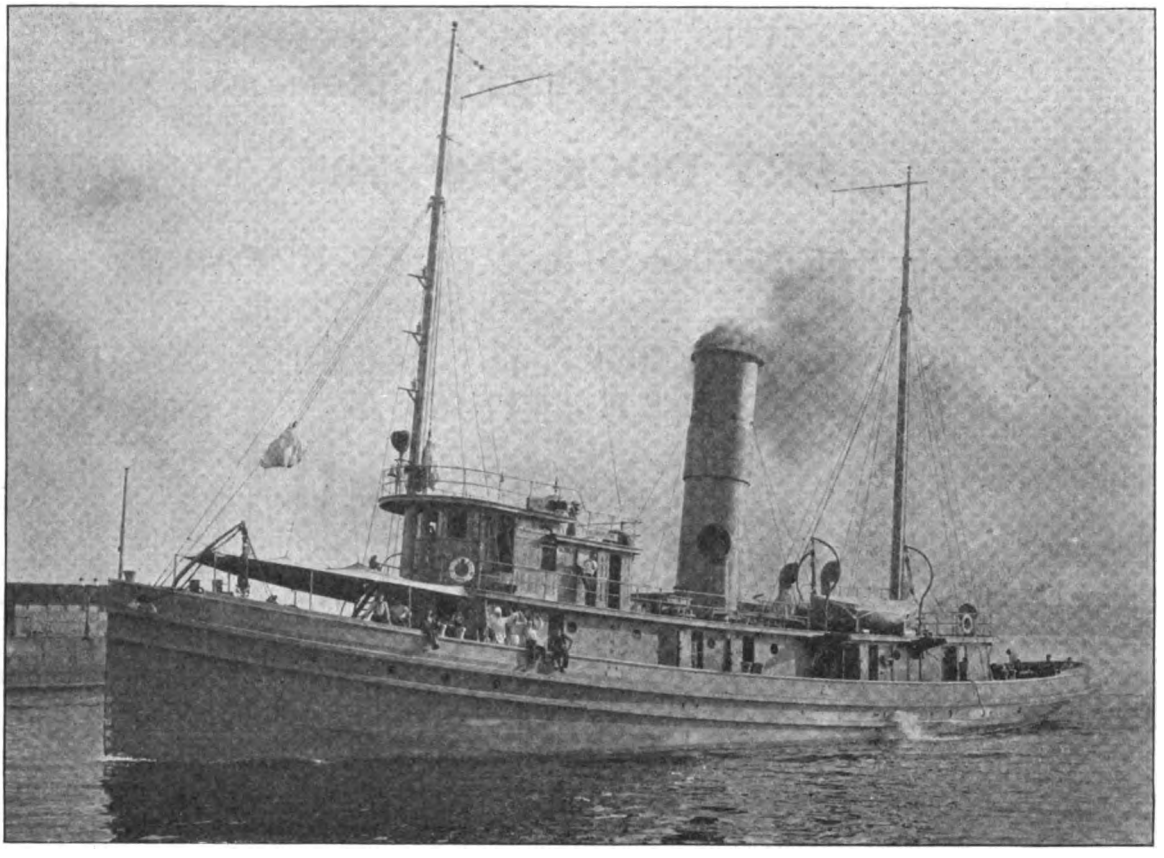
NORTHWEST ENGINEERING WORKS

Green Bay, Wis.
New York Office, Room 539, 149 Broadway, A. C. Rimmer

Digitized by Google

WHITNEY BROTHERS COMPANY

SUPERIOR, WISCONSIN



One of 10 Steel Sea Going Tugs built by this yard for the United States Shipping Board Emergency Fleet Corporation.

We are prepared to
make early delivery
on steel vessels.

TUGS AND TRAWLERS OUR SPECIALTY

Digitized by Google

FRASER BRACE SHIPYARDS, Ltd.

CONSTRUCTION AND REPAIRS

OF

STEEL AND WOODEN SHIPS

OF ALL TYPES UP TO 250'x43'x15' DRAFT

TUGS, TRAWLERS, DREDGES AND BARGES

DRY DOCK 580'x70'

GOOD FACILITIES FOR WINTER REPAIRS

WORKS AND DRY DOCK ON LACHINE CANAL AT 1300 ST. PATRICK ST.

MONTREAL, CANADA

THE COLLINGWOOD SHIPBUILDING CO.

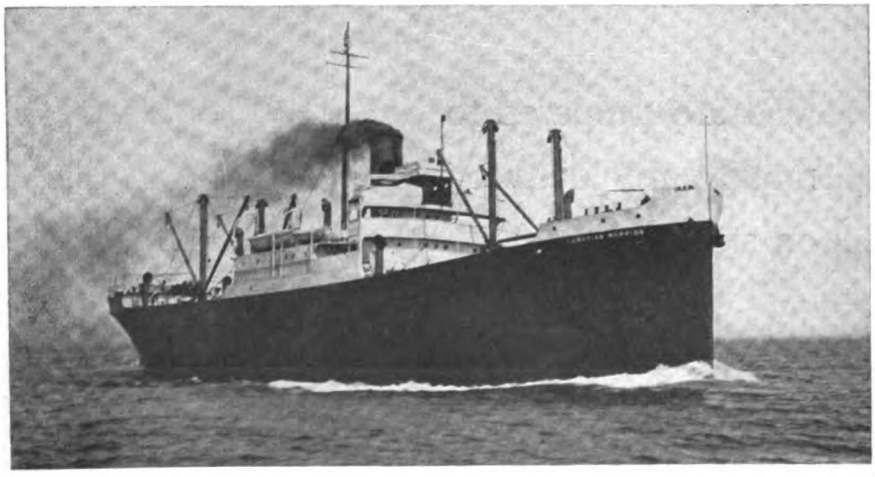
LIMITED

COLLINGWOOD, ONTARIO and KINGSTON, ONTARIO

CANADA

STEEL SHIPS, ENGINES, BOILERS, CASTINGS and FORGINGS

PLANT FITTED WITH MODERN APPLIANCES FOR QUICK WORK



S. S. "CANADIAN WARRIOR"

DRY DOCKS and SHOPS

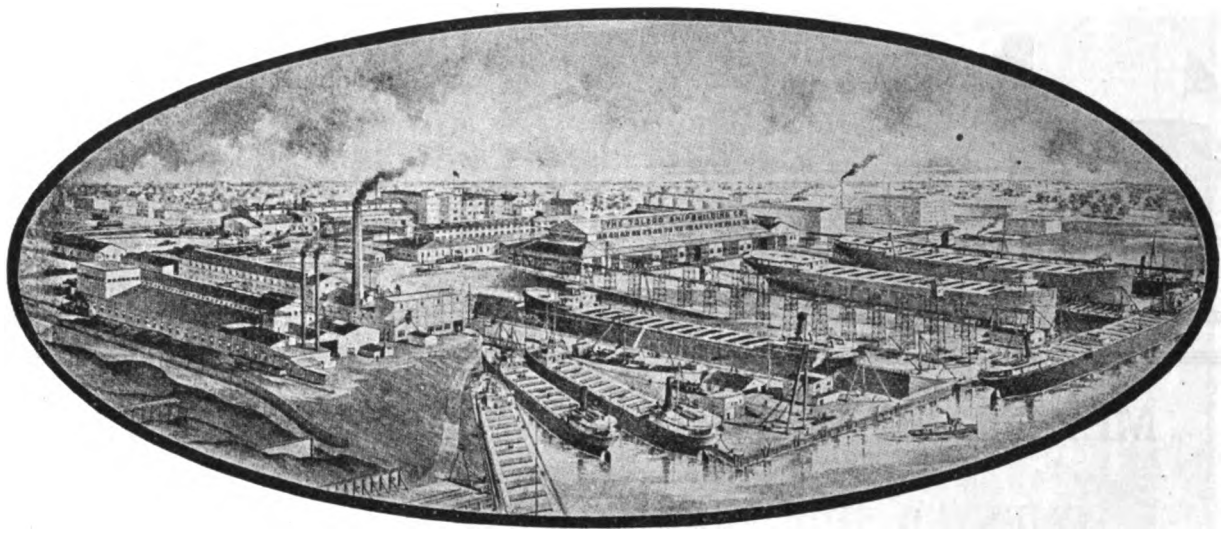
EQUIPPED TO OPERATE

DAY or NIGHT on REPAIRS

Digitized by Google

The Toledo Shipbuilding Company

TOLEDO - - - OHIO



Builders and Repairers *of* Ships and Engines

H. S. WILKINSON
President and Treasurer

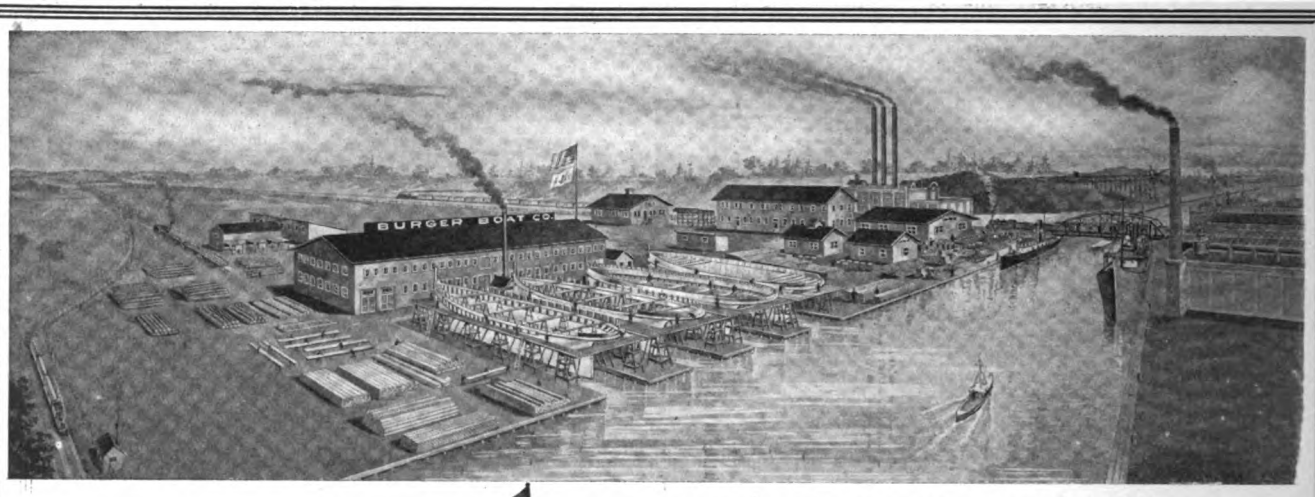
C. B. CALDER,
Vice President and General Manager

A. D. BLACK,
Secretary and Assistant Treasurer

W. G. HENDERSON,
General Superintendent

EDWARD HOPKINS,
Naval Architect

Digitized by Google



BURGER BOATS

These boats are built by boat *builders* not by boat *experimenters.*

We build any kind, any size up to 200 feet. Let us talk your requirements over with you.

BURGER BOAT CO.
MANITOWOC, WIS.

MERCHANT SHIPBUILDING CORPORATION

Successor to

CHESTER SHIPBUILDING COMPANY, LIMITED

One of the important considerations to the American shipowner, contemplating the ordering of new tonnage, is the breadth of facilities offered him. In these days of high prices of tonnage all over the world, he cannot afford to take anything less than precisely what he wants. But in these days, also, of great variety of type in shipping, not every yard which did nobly at building cargo steamers during the war, can meet the demands of the day of specialization that is dawning. But that very breadth of facilities forms one of the strongest points of our organization at Chester. We have prepared a wide range of standard designs, but more than that, we can give you any type of hull, or any recognized type of propelling machinery, you may require.

Please address all inquiries to

MERCHANT SHIPBUILDING CORPORATION

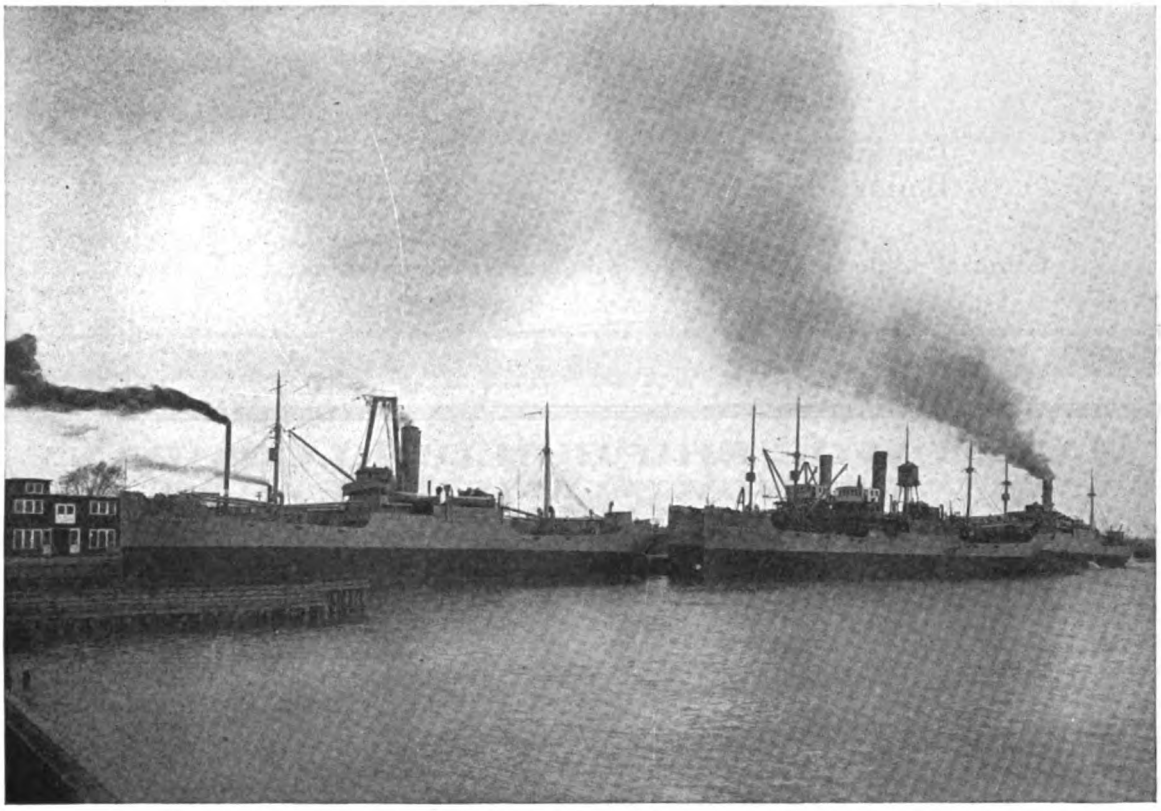
120 Broadway, New York

Digitized by Google

STEEL SHIPS

For

Lake and Ocean Service



SAGINAW SHIPBUILDING CO.

Saginaw, Michigan, U. S. A.

Digitized by Google

STANDARD TYPE STEAMERS

SUN SHIPBUILDING COMPANY

Builders of

High Class Single and Twin Screw Oil Tankers, Passenger and Cargo Boats

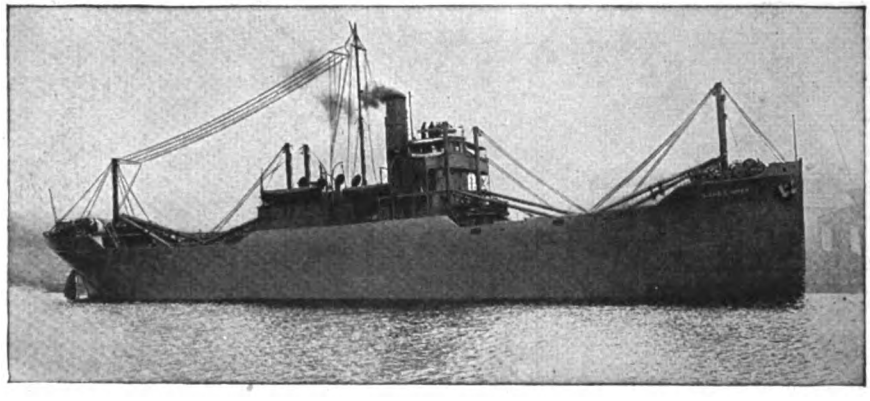
10,000 to 20,000 tons deadweight

Engine Builders
Boiler Makers

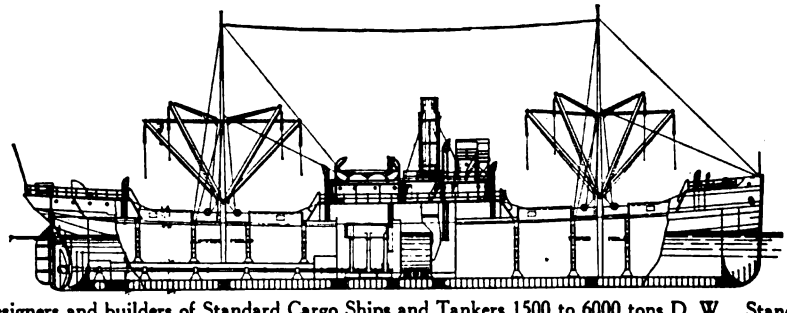
Founders
Machinists

General Offices and Plant: Chester, Pennsylvania, U. S. A.

MANITOWOC SHIPBUILDING COMPANY
MANITOWOC, WIS., U. S. A.



3400 D.W.T. Ocean going steamer Lake Linden, length overall 261'0", moulded beam 43'6", depth 23'0".



Designers and builders of Standard Cargo Ships and Tankers 1500 to 6000 tons D. W. Standard Motor Coasters 300, 500, 750, 1000, 1500 Tons D.W., Engines, Boilers and Auxiliary Machinery.

Digitized by Google

WE ARE BUILDERS OF

Steel Freight and Passenger Ships

for all services, Lake, Overseas and Coastwise.

Our facilities for Hull and Machinery Repairs are complete.

The Ohio Ship Building Co.

Beckman Bldg., CLEVELAND, OHIO

Digitized by Google

WINTER WORK!

Ship owners demanding
SPEED AND QUALITY IN REPAIR WORK
will find this organization fully equipped with every modern facility

We have special facilities for doing all kinds of boiler repairs, hull repairs, tank top work, bilge plate work, acetylene and electric welding.

We have a complete stock of steel on hand for all classes of work.

Let us give you an estimate on your next job.

Telephones
Melrose 1270
Grand 803

For night and Sunday Calls
John Geistman, Mgr.
Melrose 4524
John Abernethy, Supt.
Grand 1854

Marine Iron & Shipbuilding Co.
Duluth, Minnesota

Robins Dry Dock & Repair Co.
Erie Basin, Brooklyn, Marine Repairs

Tietjen & Lang Dry Dock Co.
Hoboken, New Jersey, Marine Repairs

Tebo Yacht Basin Co.
Foot 23d Street, Brooklyn, Shipbuilders, Engineers, Marine Repairs

Clinton Plant
Foot of Clinton Street, Brooklyn, Marine Repairs

Quintard Iron Works
742 East 12th Street, New York, Engineers, Parsons, Turbines, Boiler Makers

White Fuel Oil Engineering Corporation
601 Washington Street, New York. The most up-to-date System of Burning Fuel Oil Mechanically

Todd Dry Dock & Construction Corporation
Tacoma, Washington, Shipbuilding and Repairs

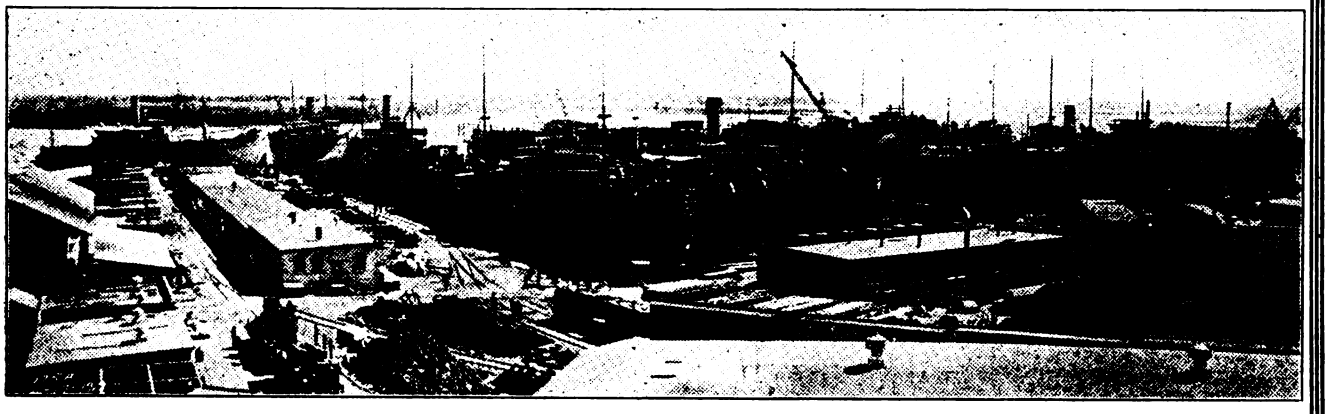
Todd Dry Docks, Inc.
Harbor Island, 16th Ave., S. W., Seattle, Washington, Shipbuilding and Repairs

MAIN OFFICE:

Todd Shipyards Corporation
15 Whitehall Street, New York

Cable Address: "ROBIN, N. Y." Telephone, Bowling Green 6900

McDougall-Duluth Co.



Shipbuilders and Engineers

Manufacturers of

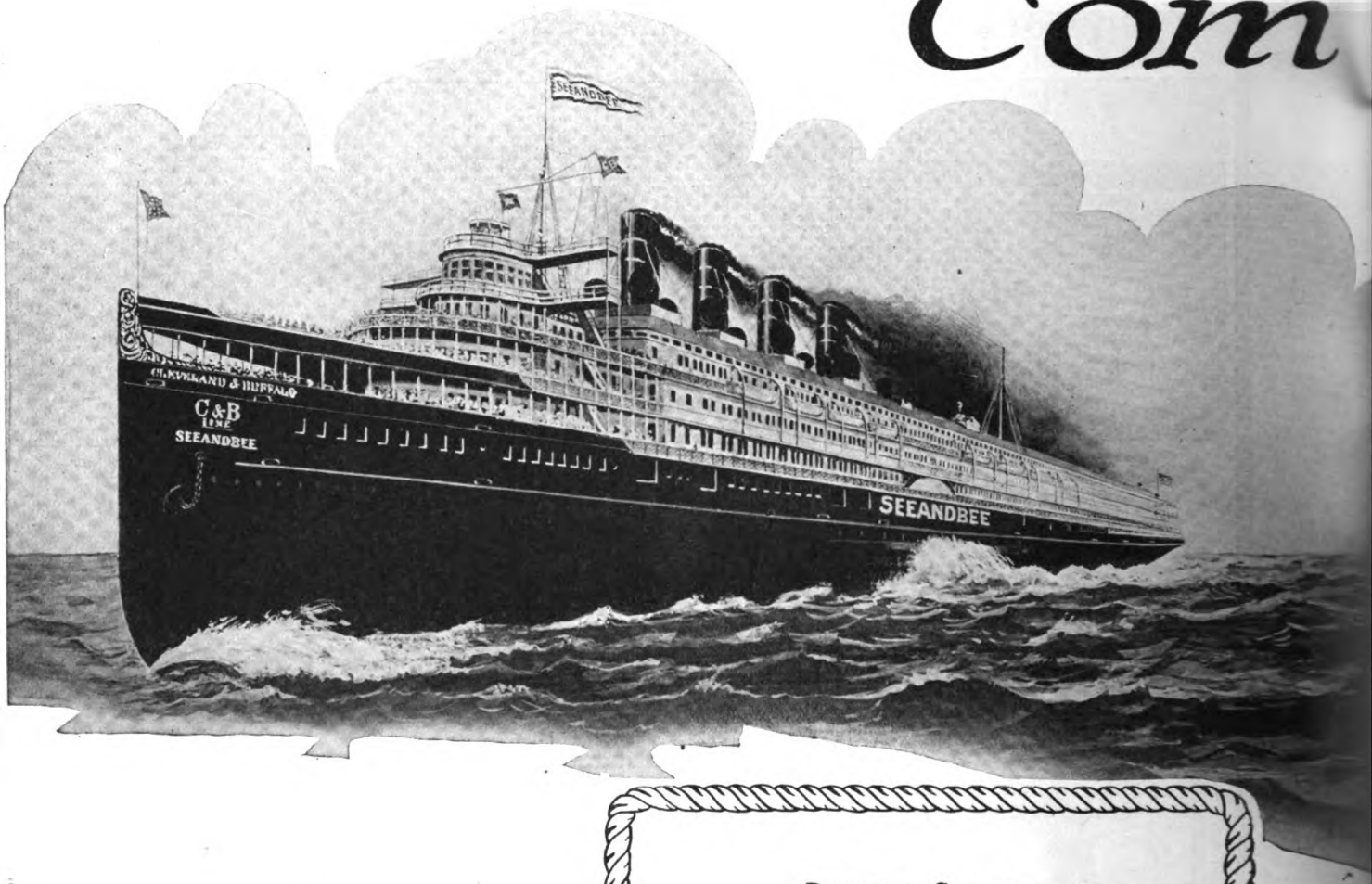
Engines, Boilers, Windlasses, Winches, etc.

Ship Repairs

Duluth (Riverside), Minnesota

Digitized by Google

The American Com



PLANTS AT

CLEVELAND, OHIO
CHICAGO, ILLINOIS
LORAIN, OHIO
BUFFALO, NEW YORK
MILWAUKEE, WISCONSIN
SUPERIOR, WISCONSIN
DETROIT, MICHIGAN
WYANDOTTE, MICHIGAN

Passenger Steamer

"SEEANDBEE"

Launched at Detroit, Nov. 9, 1912.

Length O. A., 500 ft. Beam, 58 ft.

Depth, 23 ft. 6 in. Extreme width over guards, 97 ft. 8 in. Length B. P., 485 ft.

Tonnage, 6381 gross. Speed, 24 miles.

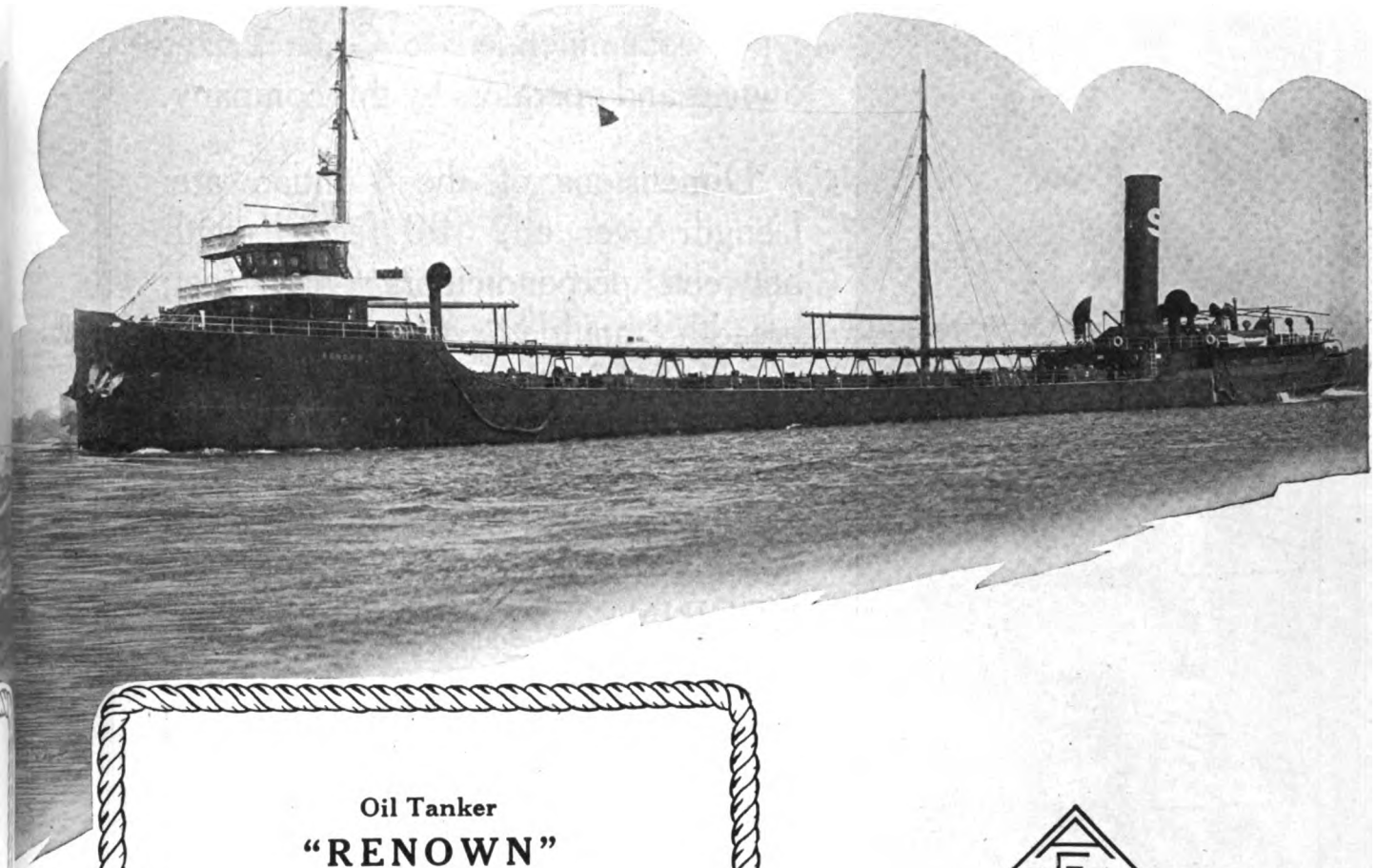
Three cylinder inclined compound engines with cylinders 66, 66 and 96-in. bore and 108-in. stroke. Engines are capable of developing 11,000 horsepower.

Six single ended boilers, 14 ft. x 10 ft. 6 in. with 54-in. furnaces, and three double ended boilers, 14 ft. $2\frac{3}{16}$ in. x 20 ft. $5\frac{1}{2}$ in. with 54 in. furnaces.

The boilers are allowed a working pressure of 165 lbs. per sq. in.

Digitized by Google

Ship Building
pany



Oil Tanker
"RENOWN"

Launched at Lorain, Ohio, 1912.

Length O. A., 394 ft. Beam, 52 ft. Depth, 25 ft. Length B. P., 380 ft. 3 in.

Capacity, 1,800,000 gallons.

Triple expansion engine with cylinders 23½, 38 and 63-in. bore and 42-in. stroke. Horsepower, 1,800.

Two Scotch boilers, 15 ft. 4½ in. diam. x 11 ft. 6 in. long. Pressure, 180 lbs.

PLANTS AT

CLEVELAND, OHIO
CHICAGO, ILLINOIS
LORAIN, OHIO
BUFFALO, NEW YORK
MILWAUKEE, WISCONSIN
SUPERIOR, WISCONSIN
DETROIT, MICHIGAN
WYANDOTTE, MICHIGAN

Digitized by Google

ONE of the best types of modern steel freighters is the Pontiac, built for the Cleveland Cliffs Iron Company in the Ecorse shipyards of the Great Lakes Engineering Works in 1917. This is one of the types recommended to Great Lakes owners and operators by this company.

Dimensions of the Pontiac are: Length over all, 600 feet; Length between perpendiculars 582 feet; breadth moulded, 60 feet, depth moulded 32 feet; carrying capacity, 13,500 net tons.

Standard and special facilities of the GREAT LAKES ENGINEERING WORKS for the construction of all types of freight and passenger ships, barges, tugs, and marine engines and for quick hull and machinery repairing of all kinds are at the service of owners and operators on the Great Lakes.

Great Lakes Engineering Works

DETROIT, MICHIGAN

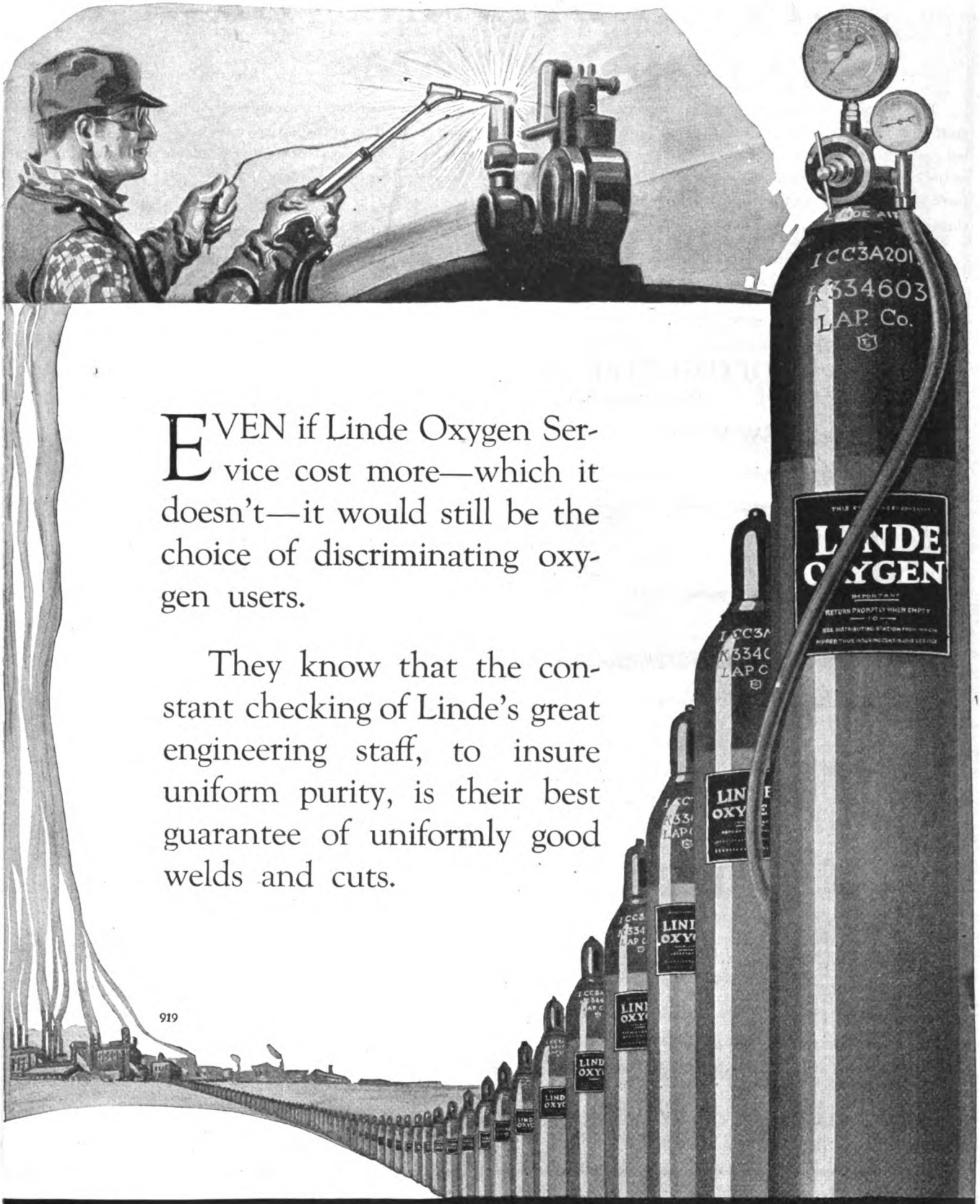
SHIPYARDS AT

ECORSE, MICHIGAN ASHTABULA, OHIO

ENGINE PLANT

DETROIT, MICHIGAN

Digitized by Google



EVEN if Linde Oxygen Service cost more—which it doesn't—it would still be the choice of discriminating oxygen users.

They know that the constant checking of Linde's great engineering staff, to insure uniform purity, is their best guarantee of uniformly good welds and cuts.

The Linde Air Products Company

Largest Producer of Oxygen in the World

30 East 42d Street
New York

KOHL BUILDING
San Francisco

SUPERHEAT AND DRAFT

The fire-tube superheater offers no increased resistance to draft and necessitates no increased air pressure. Being in the hot gas path, it presents less than one-half the amount of surface to the current of gases than do waste gas type superheaters. Its surfaces are smooth and offer no lodging place for soot and cinders.

The uptake is not obstructed. Flues are blown as easily and in exactly the same manner as in non-superheater boilers. The fire-tube superheater introduces no difficult operating problems and its location in the hot gas path instead of in low temperature waste gases insures constant dependable superheat and avoids deterioration from corrosion.

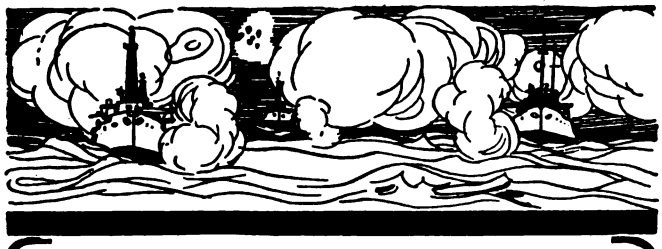
The result—an easily maintained fuel saving of from 12 to 20%.

More than 18,000 vessels are proving these statements every day.

LOCOMOTIVE SUPERHEATER COMPANY

Designers and Builders of Superheaters

30 Church St., NEW YORK **Peoples Gas Bldg., CHICAGO**



Holding the Records in the Navies of the World

The records for Economy, Capacity and Endurance in the Navies of the World, are held by

BABCOCK & WILCOX FORGED STEEL

Marine Water-Tube Boilers

and

Superheaters

Moreover, the same superior characteristics have been proved in the Merchant Marine.

Do you know that Babcock & Wilcox Boilers and Superheaters in one vessel are saving more than 15 per cent over Scotch boilers in sister vessels?

Isn't such a great reduction in coal bills of very great interest to you?

All essential parts of Babcock & Wilcox Boilers are heavier than the corresponding parts in Scotch boilers, thus giving greater security against corrosion.

Let us send you full details explaining why "Babcock & Wilcox" stands for **safety, ease of cleaning** and **simplicity of operation.**

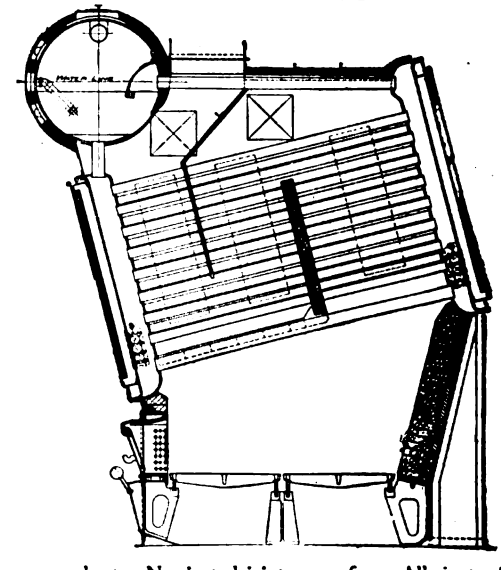
A large portion of our business consists of "repeat-orders." You know what that means. ***Write us at once.***

The Babcock & Wilcox Co.

NEW YORK and LONDON

The Wickes Marine Boiler

Water Tube Type



No wrapper sheet. No riveted joints near fire. All rivets driven in header with hydraulic riveter. One caulked joint in header visible at all times.

Write for Bulletins—Sent Free

THE WICKES BOILER CO.

Saginaw **Michigan, U. S. A.**

Sales Offices:

New York, 1716 West Street Bldg. Boston, 201 Devonshire St.
Pittsburg, 1218 Empire Bldg. Detroit, 1116 Penobscot Bldg
Chicago, 76 West Monroe St. Seattle, 736 Henry Bldg.
San Francisco, 402 Rialto Bldg.

TANK GAUGES
DRAFT INDICATORS
ELECTRIC WHISTLE OPERATORS

PNEUMERCATOR COMPANY, Inc.

Send for Catalogue

1326 Park Row Bldg., 15 Park Row **New York City**

The Oldman Boiler Works

Boilers, Tanks, Stacks, Structural Work and Castings

Boiler Repairing Promptly Attended to Day or Night

MARINE WORK A SPECIALTY **ELECTRIC WELDING**

Works: 36-40 Illinois Street - BUFFALO, N. Y.

Digitized by Google

Scotch, Leg and Water Tube

MARINE BOILERS

Unusually prompt shipment of any type Marine Boiler

Circulating, Wrecking and Dredging Pumps

High and Low Head Centrifugal Pumps

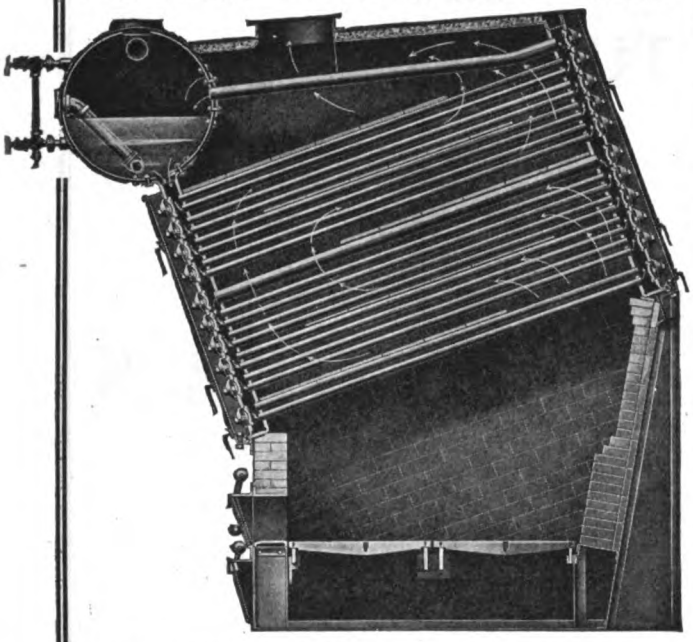
Kingsford-Stumpf Marine Una-Flow Engines

which show remarkable economy

KINGSFORD FOUNDRY AND MACHINE WORKS *Office and Works:* OSWEGO, N. Y.

WARD'S

WROUGHT STEEL MARINE BOILER



GENERATING TUBES EXPANDED. NO OTHER JOINTS. NO NIPPLE CONNECTIONS. NO STAYBOLTS.

The Charles Ward Engineering Works

CHARLESTON, WEST VIRGINIA

MARINE ENGINES RIVER STEAMERS

Ballin Water Tube Boilers

The only SECTIONAL BOILER with VERTICAL TUBES

INSTALLED IN

S. S. "H. B. Kennedy" ..... 2500 I. H. P.
S. S. "Tacoma" .....3680 I. H. P.
Ferry "Leshi".....1250 I. H. P.
S. S. "Rose City" ....3000 I. H. P.
S. S. "Solduc" .....1500 I. H. P.

U. S. Seagoing Dredge

"P. S. Michie" .....2000 I. H. P.

Fireboats

"Geo. H. Williams" ..1000 I. H. P.
"David Campbell" ...1800 I. H. P.

Suction Dredges

"Duwamish".....1500 I. H. P.
"Tualatin".....2500 I. H. P

U. S. Shipping Board Emergency Fleet Corp.,
Supple-Ballin Shipbuilding Corp., 16 3500 sq. ft. H. S. Boilers.
G. M. Standifer Construction Co., 20 3000 sq. ft. H. S Boilers

Steam generated in **Vertical Tubes** can escape to the steamdrum by its natural buoyancy, while in horizontal tubes it can only be liberated after being forced with the water into the steamdrum. Think about this important feature and understand why **BALLIN BOILERS** furnish dry steam.

Because of **Vertical Tubes BALLIN BOILERS** can use smaller tubes, which means **Safety, Light Weight, Ease of Repairs** and **Compactness.**

BALLIN BOILERS have a large **Combustion Chamber;** all Engineers know its importance.

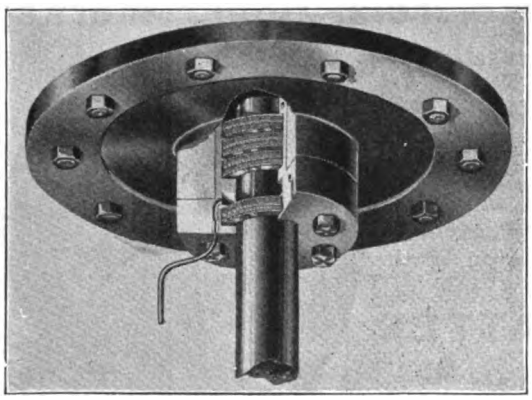
Sediment will not lodge in **Vertical Tubes,** for this reason the Engineers like them.

For Further Information Address

Ballin Water Tube Boiler Co.

East Oak and East Water Sts.

Portland, Ore.



Cut Showing Marine Type Installed

MARINE METALLIC PACKING

For Piston Rods and Valve Stems of Main Engines, Dynamo Engines, Steering Engines, Refrigerating Machines, Pumps and Steam Winches

For Over *Twenty* Years

We Have Manufactured

Holmes Marine Metallic Packings

For Government Battleships, Revenue Cutters, Coast Survey, etc.

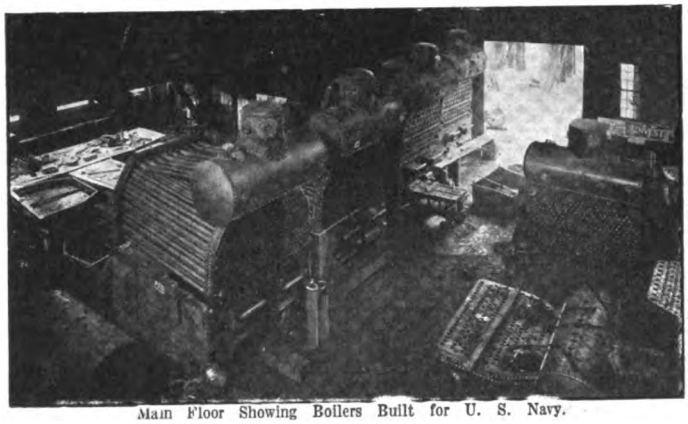
No disconnecting to apply Packing.

Originators of the Water Pocket **Originators of the Split Case**

HOLMES METALLIC PACKING CO.

WILKES-BARRE, PA.

Digitized by Google



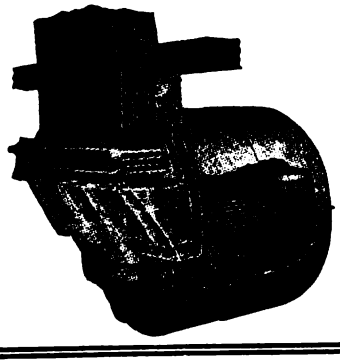
Main Floor Showing Boilers Built for U. S. Navy.

STATIONARY AND MARINE WATERTUBE BOILERS

Write for Specifications

Bridgeport Boiler Works Co.
ESTABLISHED 1865
Bridgeport, Conn.

FOSTER SUPERHEATERS



For every kind of boiler and every class of steamer.

POWER SPECIALTY CO.
111 Broadway, New York
Harris Trust Bldg., Chicago
Boston Philadelphia
Pittsburgh San Francisco

THE TYLER TUBE & PIPE CO.

Manufacturers of

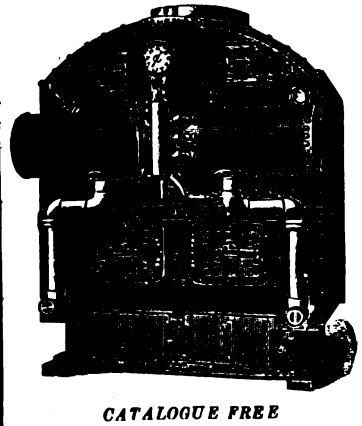
KNOBBLED CHARCOAL IRON
LAPWELD O. H. STEEL

BOILER TUBES

for Marine Purposes

Plain and Stay Tubes

General Sales Office
Washington, Pa., U. S. A.
Eastern Sales Office
30 Church St., New York



CATALOGUE FREE

Almy Water Tube Boiler Co.

Builders of Sectional Water Tube Boilers for all types of vessels

Providence, R. I.
U. S. A.

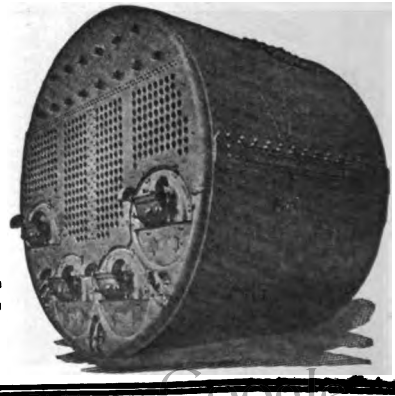
Commercial Boiler Works

Manufacturers and Repairers of Boilers

Marine Work a Specialty

All Kinds of Sheet Iron Work

SEATTLE U. S. A.



Digitized by Google

SYMBOLS OF SERVICE

Never before in the history of the Red Cross was its glorified service so greatly appreciated by mankind as it was during the world war. True, the Red Cross has always in times of peace and war followed floods, fires and other disasters in order to alleviate human suffering. Yet the world never fully comprehended until the war came that the Red Cross is a revelation of *service idealized.*

The war showed, too, the value of *service commercialized.* Such service can also be earnest and far reaching and beneficial to mankind. The Government demanded in spite of need for haste that materials be true to specifications; yet real worth remained to be proven by the test of time. Those firms, which, during the war gave such genuine service, have therein learned the lesson of service for all time to come.

The house of the Marine Decking & Supply Company is founded on the principle that the service of its products is the only commodity that it has to offer for sale. The successful service that these products have given in the past proves that this principle is sound for the future.

LITOSILO DECKING

MADESCO WOOD & STEEL BLOCKS

MARINE DECKING & SUPPLY CO. MADESCO PRODUCTS PHILADELPHIA, PA.

MADESCO BITUMINOUS SOLUTION & ENAMEL

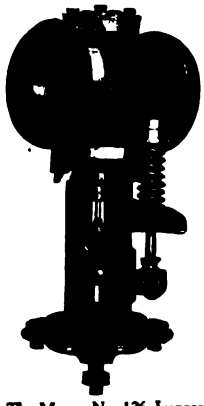
MADESCO HYDRAULIC ASH EJECTORS

NEW YORK OFFICE
21 PARK ROW

MAIN OFFICE
1011 CHESTNUT ST.
PHILADELPHIA

CLEVELAND OFFICE
GEO. RACKLE & SONS CO.

Digitized by Google



The Mason No. 126 Improved Marine Reducing Valve

THE

Mason Improved Marine Reducing Valve

Can be installed close to deck or bulkhead
ACCESSIBLE SPRING
Write for circulars to

MASON REGULATOR COMPANY

SAN FRANCISCO, CAL. BOSTON, MASS.

VOORHEES Rub-Steel Valves

Superhot Grade

Ideal for Marine Condensing. Rubber seating, continually level and steel supported against highest pressure as also disintegration in heat and oil.

"Special Soft" Grade

A soft cold water valve with rigid steel support, for fire and bilge pumps.

Distributed on the Lakes by

J. H. Ruckel & Son	Buffalo
Voorhees Rubber Mfg. Co.	Cleveland
Hardy & Dischinger Co.	Toledo
H. D. Edwards & Co.	Detroit
Alert Pipe & Supply Co.	Bay City
Hamilton Mchy. Exchange	Menominee
Seehausen, Wehrs & Co.	Chicago
Harbor Coal Co., Inc.	Michigan City
Downey Heating & Supp. Co.	Milwaukee
Marshall-Wells Hdwe. Co.	Duluth

Made only by

Voorhees Rubber Mfg. Co., Jersey City, N. J.

Booklet on request.

AMERICAN THOMPSON IMPROVED INDICATOR

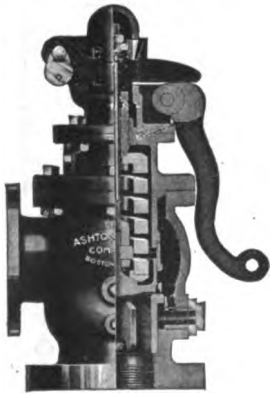
ITS rigid pencil motion and substantial construction combine in making it unequalled for

MARINE SERVICE

Send for Catalogue and request it in your work

American Steam Gauge & Valve Manufacturing Co.

New York, Chicago, BOSTON, Atlanta, Pittsburgh.



Ashton

Dependable High Grade

Pop Valves, Steam Gages Whistles

Specially Adapted for

High Pressure Marine Service

Unequalled for Efficiency, Durability and Low Cost of Maintenance

The Ashton Valve Co.

161 First St. Cambridge, Mass.

Branches

New York Boston Chicago San Francisco

TRADE PENBERTHY MARK

FOR OVER THIRTY YEARS THE PENBERTHY INJECTOR

has enjoyed recognized leadership, not alone in the United States, but throughout the world.

The Penberthy never disappoints you—it is invariably dependable. That's the reason, a pretty good one, too! You should have Penberthy feed your boilers.

Catalogue on request.

PENBERTHY INJECTOR COMPANY

Established 1886

Canadian Factory Windsor, Ont. DETROIT, MICH. New York Depot 71 Beekman St.

Digitized by Google

THE LORAIN COAL & DOCK COMPANY

General Offices—Columbus, Ohio
Branch Office—Cleveland, Ohio

PRODUCERS and SHIPPERS
PITTSBURGH and WEST VIRGINIA COALS

LOADING DOCKS
TOLEDO and LORAIN

FUEL LIGHTER
LORAIN, OHIO

COOK'S

DOUBLE MARINE TYPE METALLIC PACKING

VERY EXTENSIVELY
USED BY THE

NAVY and QUARTERMASTER'S
DEPARTMENTS of the
UNITED STATES

Installed in over FIFTEEN HUNDRED
ships, both wood and steel, for the

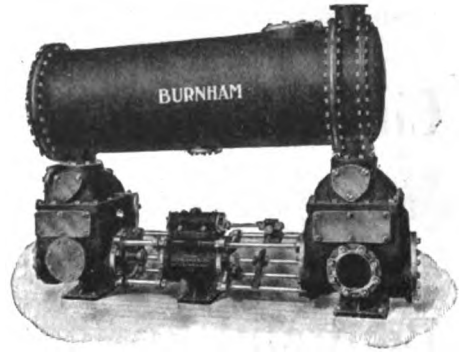
EMERGENCY FLEET CORPORATION

For full particulars please write

C. LEE COOK MANUFACTURING CO., Inc.
LOUISVILLE, KY.

Marine Surface Condensers

We have manufactured Surface Condensers for the last fifteen years, and have furnished hundreds of them for Marine Service. We are prepared to furnish you anything in the line of Condensers or Pumps you may require.



Send us your Specifications

UNION STEAM PUMP CO.
BATTLE CREEK, MICHIGAN
U. S. A.

PICKANDS, MATHER & CO.

Lighter "West Shore," Buffalo, N. Y.
Capacity 500 Tons per hour

FUEL LIGHTERS at Buffalo, Erie, Ashtabula, Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during day or night.

Western Reserve Building
CLEVELAND, O.

Digitized by Google

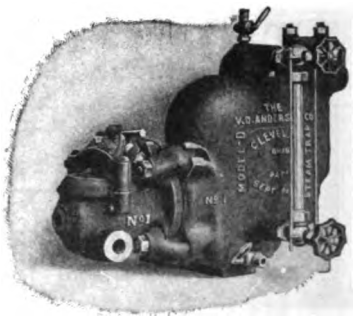
The Anderson Model "D" Steam Trap

makes your steam using apparatus more efficient by delivering live hot steam to it

It also permits you to obtain the highest efficiency from each square foot of heating surface in your plant, by removing the condensation of your steam as fast as it accumulates.

It operates continually and automatically at pressures varying from 250 pounds, to gravity.

All parts of the Model "D" Steam Trap are accurately machined to solid gauges and can be replaced at any time, as every part is made interchangeable.



WRITE FOR CATALOG

The V. D. Anderson Company, Cleveland, Ohio

We are also manufacturers of Steam and Oil Separators; Water Columns; Air Traps; and Oil and Moisture Expellers.

We Specialize

Surface Condensers

Direct Acting Steam Pumps

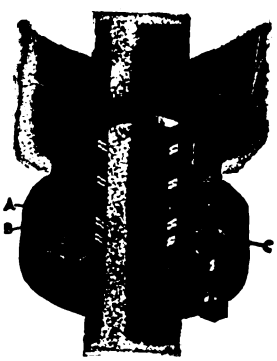
Centrifugal Circulating Pumps

Steam Traps--Condenser Tubes Heads--Ferrules

Bent and Formed Pipe and Tubes

THE HUGHES-LIMBACH CO.

512 Hippodrome Bldg., CLEVELAND, O.



FRANCE

Marine Type

Metallic Packing

For All Conditions of Service

FRANCE PACKING COMPANY

TACONY—PHILADELPHIA, PENNA.

U. S. Metallic Packing

...FOR...

Marine Engine

Piston Rods and Valve Stems

The U. S. Metallic Packing Co.

PHILADELPHIA, PA.

Write for Catalog

U. S. Injectors are automatic

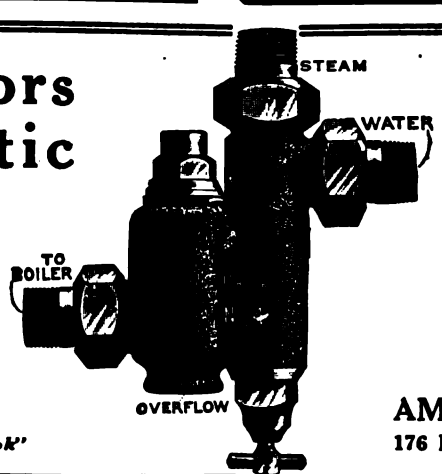
U. S. Injectors operate automatically with wide open suction at a lower steam than most injectors.

With throttled suction they are automatic at any pressure sufficient to enable injectors to get the water.

They work equally as well as a lifting injector or as a non-lifter.

Protect your boiler against feed-troubles by installing U. S. Injectors.

Write for Catalog D and "Engineers Red Book"



Superiority of U. S. Injectors

Easier to Operate—Turning on steam starts U. S. Injectors.

Wider Range—U. S. Injectors start at *lower* steam and work to *higher* steam than any other injector.

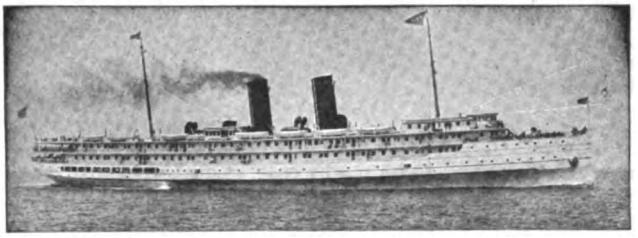
Hot Water—They handle hotter water and feed hotter water into boiler than any other injector.

AMERICAN INJECTOR CO.

176 Fourteenth Ave. Detroit, Mich.

Digitized by Google

PARSON'S MARINE TURBINES



TURBINE STEAMSHIPS YALE AND HARVARD

Marine Engines, Boilers
and Machinery of All Kinds

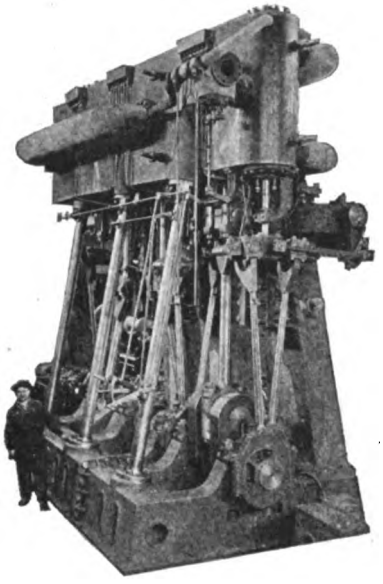
Contractors for
Vessels Complete

W. & A. FLETCHER COMPANY, Hoboken, N. J.

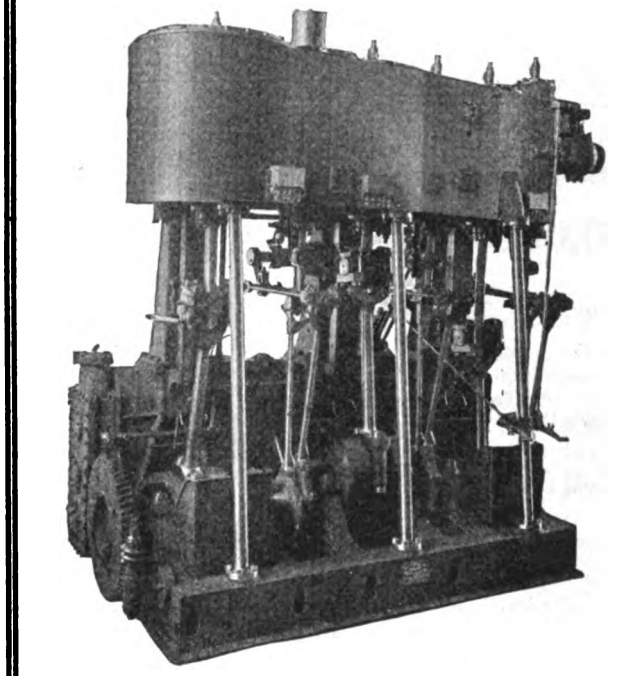
Vulcan Iron Works, Inc.

BUILDERS OF

MARINE-ENGINES & BOILERS



PARSONS
MARINE STEAM TURBINES
HUDSON ST.
JERSEY CITY, N. J.



Reproduced from photograph of one of eight 1000 horsepower engines built for the Emergency Fleet Corporation for sea-going tugs by the

BAY STATE IRON WORKS
CORPORATION

Shop at Erie, Penna. New York Office: 366 Fifth Avenue

S. S. KRISTIANIAFJORD. 16.000 tons. Fully equipped, 32 sets.

WAGER PATENT IMPROVED FURNACE BRIDGE WALL
is a preferred and valuable feature in marine and stationary boilers—endorsed by steamship, freight and passenger steamer companies, private yacht owners, railroads and stationary plants.

ECONOMICAL SIMPLE IN DESIGN DEPENDABLE

Literature mailed on request.

WAGER FURNACE BRIDGE WALL CO.
Mr. Robert H. Wager, President
149 Broadway, New York City, N. Y.

Learn all about the
SPECIAL FEATURES
OF
MARTELL PACKINGS

Before Specifying or Placing Orders

WRITE FOR CATALOG

THE MARTELL PACKINGS CO., Elyria, O., U. S. A.

GET THE BEST

W. S. HAZLETT
Eastern Representative
2069 East Dauphin St.
Philadelphia, Pa.

FORD & GEIRRINE
Pacific Coast Agents
Marine Trade
720-722 Merchants Exchange Bldg.
San Francisco, Calif.

Digitized by Google

-THE MILWAUKEE CRANE-

"*Milwaukee Cranes*" are built for service. Shipyards all over the country are using them.

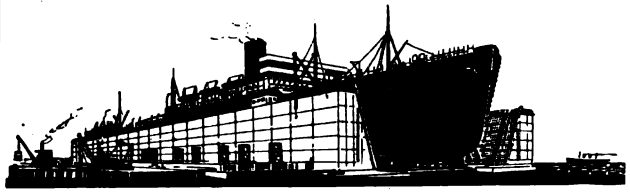
A shipyard is no better than its poorest equipment. Don't let the poor equipment consist of your cranes where a slip might cost lives. Specify "The Milwaukee Crane" and get the best.

Let us know your requirements—a letter telling of your needs will put one of our engineers at your service.

PITTSBURGH:
2201 FARMERS BANK BLDG.

MILWAUKEE ELECTRIC CRANE & MFG. CO.
MILWAUKEE, WISCONSIN

NEW YORK:
50 CHURCH ST.



20,000 Tons Lifting Capacity

New Floating Dry Dock at Sparrows Point Plant, Sparrows Point, Md. Now in Operation

Other Docking Facilities

Pacific Coast—Union Plant, San Francisco, Cal.

Graving Docks.	No. 1. Length 1096 ft., width 120 ft., depth over sill 40 ft. (one of the largest docks in the U. S.)	
	No. 2. Length 750 ft., width 103 ft., depth over sill 28 ft.	
Floating Docks.	No. 1. Length 450 ft., width 100 ft.	Maximum Lifting Capacity 10,000 tons
	No. 2. Length 301 ft., width 68 ft.	
	No. 3. Length 271 ft., width 62 ft.	
Marine Railways.	No. 1. Length 320 ft., capacity 4000 Tons	
	No. 2. Length 220 ft., capacity 2000 Tons	

Atlantic Coast—Harlan Plant, Wilmington, Del.

Graving Docks.	No. 1. Length 330 ft., width 45 ft., depth over sill 13 ft.	

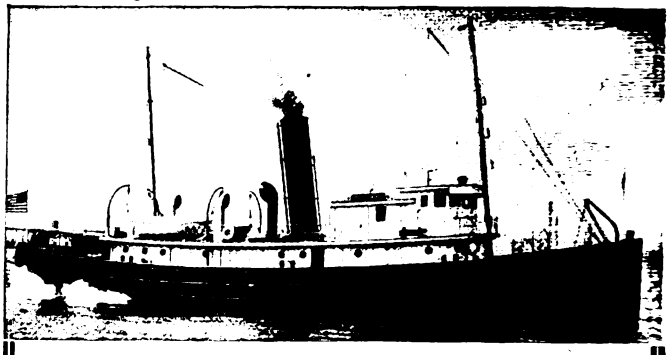
PLANTS

Fore River, Quincy, Mass. — Harlan Plant, Wilmington, Del.
Moore Plant, Elizabeth, N. J. — Union Plant, San Francisco, Cal.
Sparrows Point Plant, Sparrows Point, Md.

Shipbuilders and Engineers — Marine and Stationary Engineers
Curtis Marine Turbines — Auxiliary Machinery
Water Tube and Scotch Boilers — Special Facilities for Repair Work

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
BETHLEHEM, PA.

BRANCH OFFICES
111 Broadway, New York — 260 California Ave., San Francisco



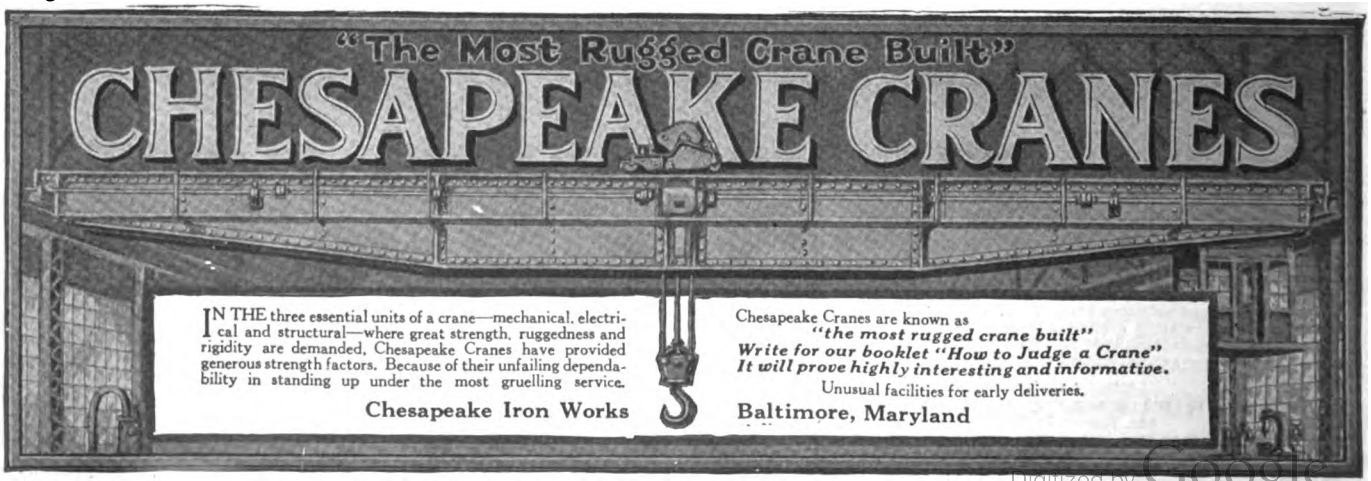
THIS is the "Artisan," one of eight seagoing tugs built for the United States Shipping Board by the Davis Shipyard. She is 133 feet long, has a 1000 horse-power engine and two Scotch boilers. She is the 66th tug built by the Davis Yard. If you want the benefit of 39 years' experience in tug building, write

M. M. **DAVIS** & SON INC.

SOLOMONS, MD. — 366 FIFTH AVE., N. Y.

"The Most Rugged Crane Built"

CHESAPEAKE CRANES



IN THE three essential units of a crane—mechanical, electrical and structural—where great strength, ruggedness and rigidity are demanded, Chesapeake Cranes have provided generous strength factors. Because of their unfailing dependability in standing up under the most gruelling service.

Chesapeake Iron Works

Chesapeake Cranes are known as
"the most rugged crane built"
Write for our booklet "How to Judge a Crane" It will prove highly interesting and informative.
Unusual facilities for early deliveries.

Baltimore, Maryland

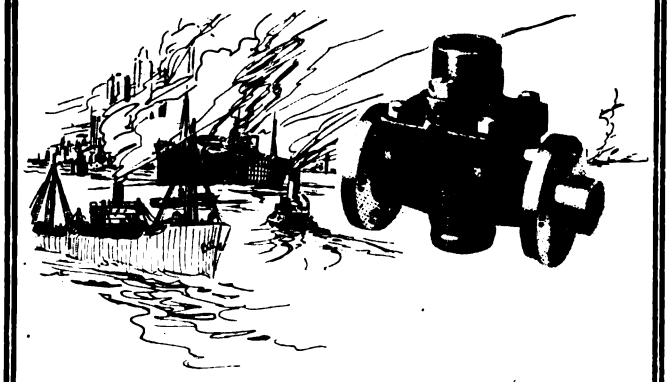
Digitized by Google

SULLIVAN LUMBER CO.

FIR TIMBERS

SHIP DECKING, PLANK, SPARS

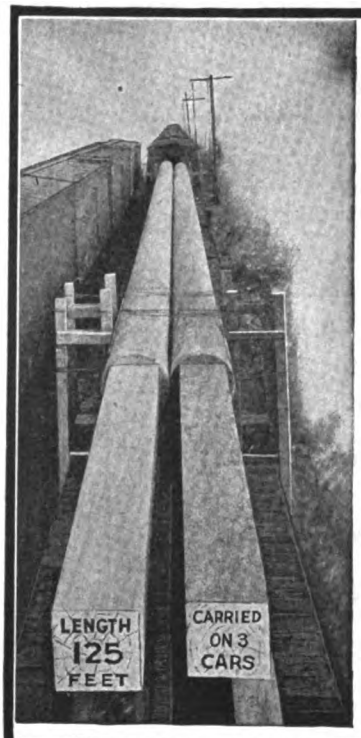
PORTLAND, ORE.



Special Valves

Any standard or special type of valve in brass or iron made exactly according to specifications. We have patterns for many types of overboard discharge valves, sea cocks, blow-off cocks, screw-down check valves, weighted check type of angle and globe valves and others. Write for quotations.

Kerr Machinery Corporation
Marine Equipment Division
Kerr Building — Detroit, Mich.



MASTS

SPARS
BOOMS
DREDGER SPUDS

Wherever ships go—there you will find the product of our mill.

From the best timber on the Pacific Coast—and it's the finest in the world — we make masts, spars, cargo booms, dredger spuds and all turned material for ship's use. From the smallest to the VERY LARGEST.

MACHINE MADE
according to
YOUR BLUE PRINTS
and furnished
READY FOR THE
IRONS

Send Us Your Specifications

WESTERN SPAR COMPANY

SPALDING BUILDING PORTLAND, OREGON

STRATFORD OAKUM

QUALITY GUARANTEED

JERSEY CITY and EVERYWHERE

GEO. STRATFORD OAKUM CO., 165 Cornelison Ave., Jersey City, U. S. A.

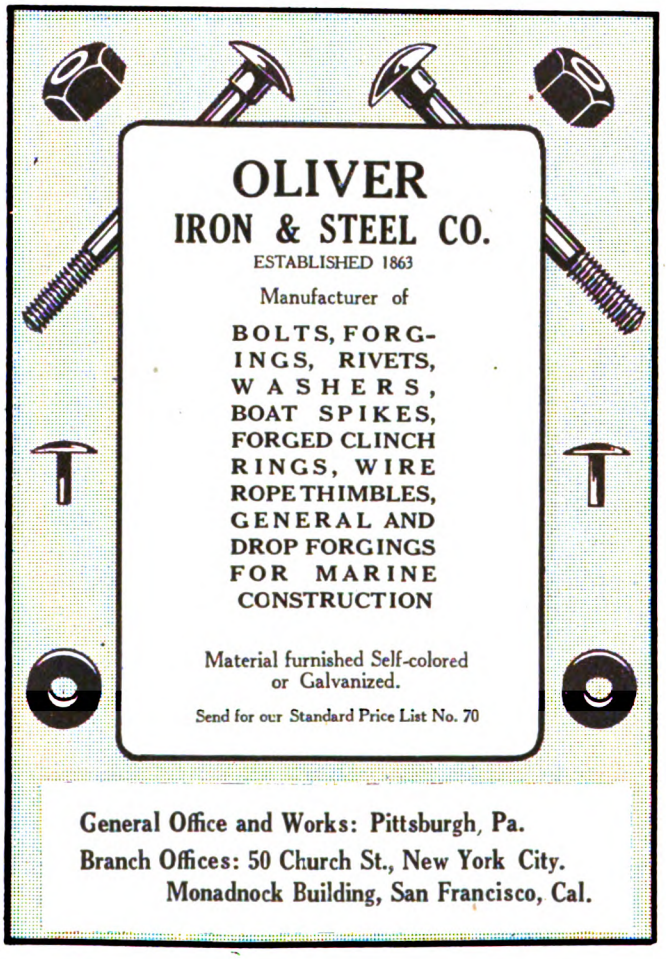
Digitized by Google

Atlas Steel Casting Company

General Office and Works:
BUFFALO, N. Y.

Acid Open Hearth Steel Castings Exclusively

FRANK D. MOFFAT & CO.
New York and New England Sales Agents
81 Fulton Street, New York



OLIVER
IRON & STEEL CO.
ESTABLISHED 1863
Manufacturer of
BOLTS, FORGINGS, RIVETS, WASHERS, BOAT SPIKES, FORGED CLINCH RINGS, WIRE ROPE THIMBLES, GENERAL AND DROP FORGINGS FOR MARINE CONSTRUCTION

Material furnished Self-colored or Galvanized.

Send for our Standard Price List No. 70

General Office and Works: Pittsburgh, Pa.
Branch Offices: 50 Church St., New York City.
Monadnock Building, San Francisco, Cal.

Send Us Your Specifications

Anything in the Marine Supply Line is in our Line.
Immediate Shipment from Stock and Mill

C. C. Galbraith & Son, Inc.

MANUFACTURERS JOBBERS

Office:—90 West Street, New York City.
Warehouses:—47 West Street, N. Y., and Keyport, N. J.

WE SPECIALIZE IN

Spikes (Boat, R. R. Dock)	Chain	Anchors
Oakum (Spun and Unspun)	Galv. Iron, etc.	Portlights
Caulking Cotton	Deck Pitch	Turnbuckles
Ship's Fittings	Clinch Rings	Blocks
Ship's Hardware	Wedges & Deck Plugs	Ship's Telegraphs

WE BUILD

Life Boats (Wood)	Capstans	Pumps (Edson)
Life Boats (Metallic)	Motor Yawls	Life Boat and
Life Rafts (Metallic)	Windlasses	Life Raft
Life Rafts (Emergency)	Wood Working Boats	Equipment

WE MANUFACTURE

Cork Ring Buoys	Chocks	All Castings
Life Preservers	Cleats	Distress Signals
Locust Treenails	Bitts	Water Lights
Line Throwing Guns	Manhole Plates	Rope Fenders
Wood Fenders	Hawser Reels	Pilot Signals, etc.

SHIP BOILER STRUCTURAL RIVETS

made to meet any specifications

S. Severance Mfg. Co.

Glassport, Pa. (Suburb of Pittsburgh)

Digitized by Google

GRACEY'S
IMPROVED
DOUBLE ACTING
RATCHET PULLING JACK
Saves time and labor in ship yards

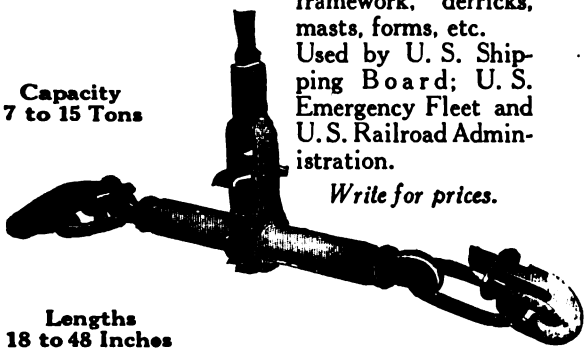
Originally designed for steamboat and river work, hitching tows, fastening rafts, floats, etc.

Now improved so that they are wonderfully effective for use in shipbuilding for fastening and holding in place the skeleton steel framework, derricks, masts, forms, etc.

Used by U. S. Shipping Board; U. S. Emergency Fleet and U. S. Railroad Administration.

Write for prices.

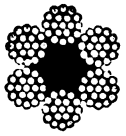
Capacity 7 to 15 Tons



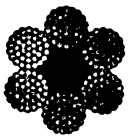
Lengths 18 to 48 Inches

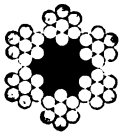
R. GRACEY & SONS COMPANY
113-115 FIRST AVENUE, PITTSBURGH, PA., U.S.A.

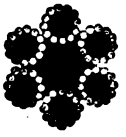
Leschen Wire Rope
— for —
Ships and Shipbuilding



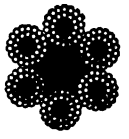
Hoisting Ropes
Hawsers
Towing Lines
Guys
Mooring Lines
Rigging







Every Leschen Wire Rope has back of it over 60 years of manufacturing experience.



Established 1857

A. Leschen & Sons Rope Co.
ST. LOUIS, MO.

New York Chicago Denver San Francisco

SEAMLESS DRAWN TUBING
MADE BY EXPERTS IN CONDENSER WORK

Wheeler Crescent Brand tubing is made in all lengths and sizes, including iron pipe sizes. All shapes. Especially adapted to uses where the highest quality is essential as in condensers, evaporators, heaters, reboilers, etc.

Used exclusively in Wheeler Equipment—over 2,000,000 lbs. per year.

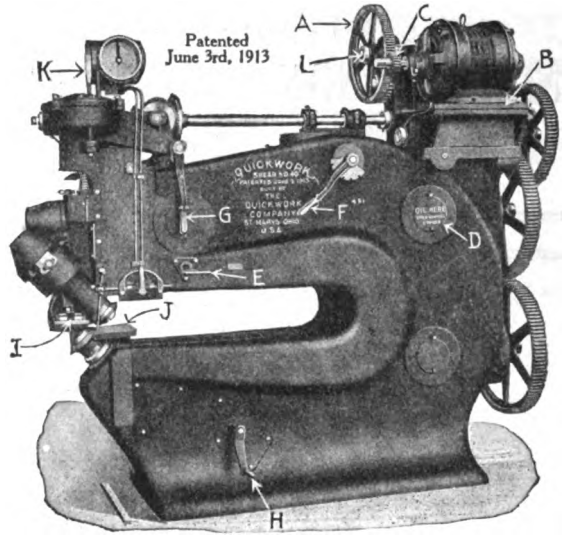
You are invited to make use of our Research Department which is constantly solving tube problems for our customers.

WHEELER CONDENSER & ENGRG. CO.
Carteret, N. J.

Manufacturers of Seamless Brass and Copper Tubes, Condensers, Vacuum Pumps, Centrifugal Pumps, Evaporators. Everything in the condensing line for use on board ship. 52

"QUICKWORK"
Reg. in U.S A. and Foreign Countries
ROTARY SHEARS
MADE IN 7 SIZES.

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from side of sheet. Leaves square true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



Save 50% to 90%
Eliminates oxyacetylene cutting and plate planing.
Write for Catalogue No. 60.

THE QUICKWORK CO. ST. MARYS OHIO, U. S. A.
Cable Address "QUICKWORK" **CODES: W. U. & General**

Digitized by Google

HERMASTIC
gives durable protection

BITUMINOUS COATINGS

FOR

BILGES, TANK TOPS, COAL BUNKERS, INNER BOTTOM TANKS, FLOORS, PEAKS, REFRIGERATING SPACES

AMERICAN BITUMASTIC ENAMELS COMPANY

17 BATTERY PLACE, NEW YORK

PHILADELPHIA CLEVELAND

COTTON DUCK

for Sails

Also Wide and Army Duck, Double Filling, Single Filling, Filter Cloth, Hose, Belting, Dryer Canvas, Yarns, Narrow and Wide Drills, Twills, Sheetings and Specialties.

Rope, Twine, Caulking Cotton, Etc.

TURNER, HALSEY CO.

62 Leonard Street, New York City

Sales Agent for

MT. VERNON-WOODBERRY MILLS, INC.

Eliminate constant repairing and caulking

by using

ELASTIC SEAM-COMPOSITION TRADE MARK

ELASTIC SEAM PAINT AND ELASTIC GLAZING COMPOSITION

These three elastic preparations insure a permanent protection against loss and expense due to faulty joints. They are *long-life compositions* and records of their use show phenomenal endurance and economy.

Send for booklet and prices.

H. B. FRED KUHLS

65th St. and 3rd Ave.
Brooklyn, N. Y.

"Wire your ships against fire"

TRADE FDW SYSTEM MARK

AUTOMATIC FIRE ALARM

Fire Detecting Wire Co., Inc.
2 West 45th Street, New York
Telephone 3526 Vanderbilt

Ship Cable Chain
Steering Gear Chain
Stud Link Chain
Marine Chain

AMERICAN CHAIN COMPANY
INCORPORATED

BRIDGEPORT, A·C·C CONN., U. S. A.

LARGEST CHAIN MANUFACTURERS IN THE WORLD

Digitized by Google

Use Livingston Electric Service

For PLANNING and INSTALLING new equipment

For RENEWAL and REPAIRS to old equipment

For SCIENTIFIC ILLUMINATION of the factory and yard

For PURCHASE of apparatus and supplies

Generator Sets, Wireless Sets, Switchboards
Marine Lighting Fixtures, Marine Fittings,
Electrical Merchandise

Correspondence Invited

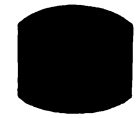
J. LIVINGSTON & CO., Inc.
GRAND CENTRAL TERMINAL, NEW YORK

Show Rooms and Warehouse
104 E. 41st. ST.
NEW YORK

LIVINGSTON ELECTRIC SERVICE

Branch Offices
SYRACUSE, N. Y.
CLEVELAND, OHIO
WASHINGTON, D. C.
GLEN COVE, L. I.

The Bryant Lamp Receptacle For Sea Service



Base is of unbreakable molded composition; no unprotected steel to rust in moist salt air. Double binding screw terminals are provided so that taps may be taken directly off terminal plate without soldered connections in the box.

Two of these receptacles can be mounted in a four-inch round box; and a separate circuit can be run through groove of receptacle base.

The Insulator, listed separately, is used when necessary to protect the screw shell.

Keyless receptacle, switches, fuse and interconnecting blocks, "Spartan" receptacles and caps —all approved fittings—are included in the Bryant Marine Line. Write for details.

THE BRYANT ELECTRIC COMPANY
BRIDGEPORT, CONN.
NEW YORK CHICAGO SAN FRANCISCO
2052A

Congressional Information Bureau

CLAUDE N. BENNETT, Manager
H. A. COLMAN, Secretary
JAMES I. PARKER, Law Department
D. L. SELKE, Research Department
Established 1897
Southern Building
Washington, D. C.

We make a business of preparing to order for clients throughout the country any data wanted from Washington—statistical, historical, legal or otherwise; of keeping them advised upon matters pending in Congress, the departments and the courts; of representing them in any desired capacity.

Special attention to all matters relating to shipping: Daily reports covering orders and regulations issued by the Shipping Board; the allocation of vessels and assignment of managers and operators; announcements or rulings concerning freight rates.

Rulings of the War Trade Board; decisions of the Treasury Department; departmental and congressional action upon immigration; attention to business before all Government Departments.

We represent bidders on supplies for all bureaus of the Government.

Legal service, when desired, in charge of a competent law department.

In Your Ship's Equipment for 1920 Install a Benson Flashlight and Electric Whistle

You will be sure that the other pilots get your signals even in the darkest night or thickest weather.

And the whistle pull never gives out during a fog.

Both are dependable.

BENSON ELECTRIC CO.
DULUTH MINN. No. 2 Rector St. NEW YORK CITY SUPERIOR WIS.

When you write tell us in what port you will lay up.

Digitized by Google

JUST 10

IN STOCK

30" Cast Iron Cleats

Pattern No. 2046 A

Weight 111 lbs. each

READY FOR PROMPT SHIPMENT

but subject to prior sale.

Write at once.

THE CENTRAL FOUNDRY COMPANY

90 WEST ST. NEW YORK

M-117

NORWALK AIR & GAS COMPRESSORS

For Durability

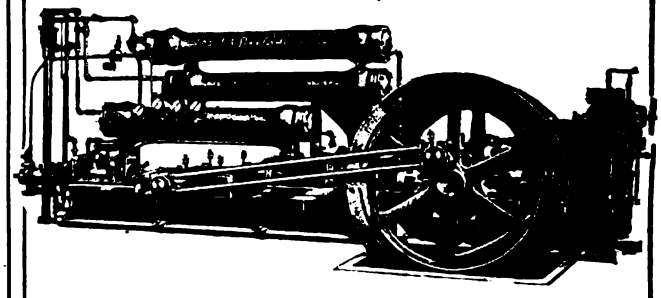
THERE are Norwalk Compressors still in use and giving good service which were installed a score of years ago. They have needed few repairs and fewer replacements.

Write for Bulletins on air, oxygen, hydrogen, acetylene or carbonic acid gas. One or all on request.

THE NORWALK IRON WORKS CO.

Pioneer Builders of Compressors

South Norwalk, Conn.



24-Inch Stroke Large Four-Stage Single Steam Cylinder-Driven Air Compressor

---

Swartwout

Developed to meet the unprecedented need for speed in wartime ship construction, the Swartwout Standardized Cowl (patent applied for) is equally adapted for competitive building.

It enables the builder to specify a cowl complete with turning gear merely by name and size, being assured in return the highest grade of sheet metal craftsmanship and a design reducing skin friction to a minimum. Cowl and gears have been used by the U. S. Shipping Board and Emergency Fleet Corporation.

Bulletin on request.

Reg. U. S. Pat. Off.

Swartwout The OHIO Blower Co. Cleveland U.S.A.

The Ohio Blower Co.

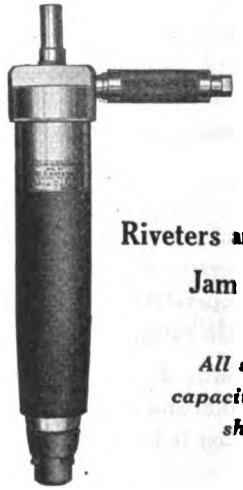
Cleveland, Ohio, U. S. A.

Geo. Oldham & Son Co.

Manufacturers of

PNEUMATIC TOOLS

Frankford, Philadelphia, Pa.



Chipping and Calking Hammers

Riveters and Holder-Ons

Jam Riveters

All sizes and capacities for the shipyard

Complete line of pneumatic tools of merit

FOR SHIPBUILDING

TOOLS SENT ON APPROVAL

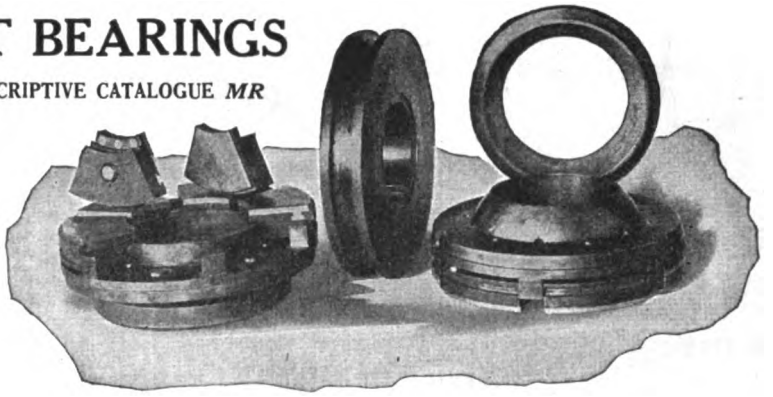
Digitized by Google

KINGSBURY
Patented

THRUST BEARINGS

SEND FOR DESCRIPTIVE CATALOGUE *MR*

SELF OILING TYPE OR GRAVITY FEED TYPE FURNISHED AS REQUIRED



MINIMUM FRICTION LOSS

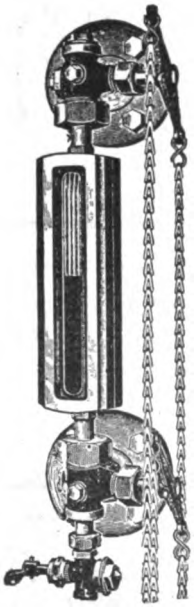
End thrust problems need not be avoided. Kingsbury Thrust Bearings are durable and are more efficient than journal bearings.

ALBERT KINGSBURY, ENGINEER

Oliver Building Pittsburgh, Pa.

A DOUBLE HORIZONTAL TYPE IS SHOWN ABOVE A-110

JERGUSON



Engineering Specialties

Reflex Water Gages

Used on all types of boilers by all the Principal Navies of the World

"The Water Shows Black"

ADVANTAGES:

Quick and reliable observation of the water level. Safe, sure and durable at high pressures. Not affected by cold air drafts. Most effective protection against injuries to boilers and workmen. Easily applied to all types of gage glass fittings.

When filled with **WATER** the Reflex Gage always appears **BLACK.** When empty it instantly shows **WHITE.** No mistake possible. This feature alone is worth many times the cost of the Reflex.

We specialize in water gage apparatus.

Jerguson Gage & Valve Co.

Winter Hill, Somerville, Mass.

Deane's Oil Burning Galley Ranges

have been designed to meet the latest need in galley equipment. They embody every feature that has made

Deane's Galley Equipment

standard on all varieties of vessels from private yachts and ocean liners to transports and super-dreadnaughts. They are built of Armco rust-resisting iron, include every needed accessory and are delivered ready for immediate installation.

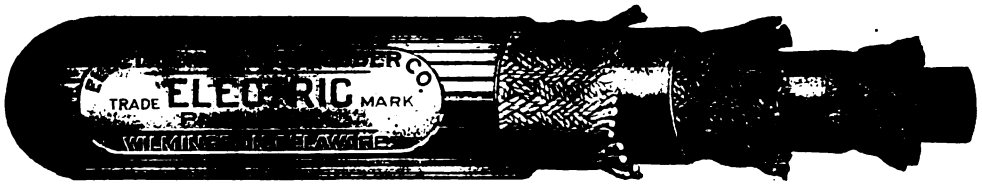
Ship builders and naval architects should have full information regarding this important development in galley equipment.

BRAMHALL, DEANE CO.

Galley Outfitters Since 1859

263 B. West 36th Street, New York

"ELECTRIC" (Moulded) Pneumatic and Rock Drill Hose



"ELECTRIC" HOSE WEARS LIKE A PIG'S NOSE

New York, U. S. A.

¶ Far and away the BEST air hose ever put on the market. Positively the highest in intrinsic value of material used, and it will be found cheapest in per diem expense in service, regardless of price comparisons with lower grades. ¶ Eight other styles and grades of Air Hose to choose from. ¶ Rubber Hose for All Purposes. ¶ Largest Exclusive Hose Manufacturers in the World—Capacity 125,000 ft. per day.

ELECTRIC HOSE & RUBBER CO. ***Hose Specialists*** **Wilmington, Delaware, U.S.A.**

Branches: Philadelphia, New York, Cleveland, Chicago, New Orleans, London, Eng.

Digitized by Google

This page is conducted for the vessel agent and insurance agent who has a real service to offer the vessel owner and operator.

Consign your Steamers to

H. VAN KRIEKEN & COMPANY

ROTTERDAM

Ship Owners and Brokers Chartering and Forwarding Agents
Coal Merchants, Stevedores

Owners of Floating Cranes, with Grabs (capacity 600 tons daily).

Telegrams: "GEJOSOF." Codes: WATKIN'S, SCOTT'S, A. B. C. (5th Edition).

O. W. BLODGETT MYRON BLODGETT

O. W. BLODGETT

Lake Transportation and Insurance

Season of Navigation Address: 312 Lyceum Building, Duluth, Minn.
Winter Address: Bay City, Mich.

OSBORN & COMPANY

INSURANCE - AVERAGE ADJUSTERS

Hulls and Cargoes (All Classes). Direct facilities for placing insurance in all home and foreign markets.

INSURANCE EXCHANGE
175 West Jackson Blvd. CHICAGO, ILL.

John J. Boland Adam E. Cornelius

BOLAND & CORNELIUS

VESSEL OWNERS AND BROKERS

Marine Insurance Agents

1204 Prudential Building

BUFFALO, N. Y.

W. C. Richardson Clarence E. Richardson
John T. Kelly Tracy H. Paine

W. C. RICHARDSON & CO.

VESSEL OWNERS AND BROKERS AND
MARINE INSURANCE AGENTS

816-818 Leader-News Bldg., Cleveland, O.
Office Tel., Main 338
Residence 'Phone { W. C. Richardson, Doan 404
John T. Kelley, East 3610
Clarence E. Richardson, Eddy 492

EDWARD P. FARLEY CO.

Vessel Brokers

Passenger and Freight Steamers, Tugs, Lighters, Self-Propelled Canal Barges

1501 Railway Exchange Bldg. Chicago, Illinois

CARL C. JOYS Hanover 260

VANCE & JOYS CO.

A. W. MATTER Kilbourn 3961

VESSEL AND INSURANCE AGENTS

302-304 First National Bank Building

TELEPHONES, BROADWAY 3907-3908

MILWAUKEE, WIS.

C. L. Hutchinson W. H. McGean

HUTCHINSON & CO.

VESSEL AND INSURANCE AGENTS

Phones: { Office, Main 2453
Res., C. L. Hutchinson, Marlo 244
Res., W. H. McGean, Garfield 274

1011 Leader-News Bldg. Cleveland

This page of Professional Cards is a directory for the vessel owner or operator. You can have your card in this directory at a surprisingly low cost.

Digitized by Google

INTERNATIONAL MERCANTILE MARINE COMPANY

AMERICAN LINE

UNITED STATES MAIL STEAMERS
UNDER THE AMERICAN FLAG

FAST EXPRESS SERVICE
NEW YORK—GREAT BRITAIN

FLEET
"ST. LOUIS"
"NEW YORK"
"FINLAND"
"ST. PAUL"
"PHILADELPHIA"
"KROONLAND"

OFFICES
9 Broadway, New York
1319 Walnut St., Philadelphia
India Bldg., 84 State St., Boston
1208 F St., N. W., Washington
Hibernia Bank Bldg., New Orleans
14 N. Dearborn St., Chicago
338 Oliver Ave., Pittsburg
286 Main St., Winnipeg
11th and Locust Sts., St. Louis
121 South Third St., Minneapolis
30 Montgomery St., San Francisco
619 Second Ave., Seattle
41 King St. East, Toronto
McGill Building, Montreal

Montreal Transportation Company

LIMITED

DRY DOCKS AND SHIP YARD

Port Dalhousie, Ont.

SHIP, MACHINERY AND BOILER REPAIRS

We have two Docks offering facilities for the repair of both steel and wooden vessels. One Dock is 250 feet long on keel blocks; 45 feet width of gate and 12 feet over sill. The other Dock is 185 feet on keel blocks; 45 feet width of gate and 12 feet over sill. Rudder pit in larger Dock. Electric light for night work.

MAIN OFFICE AT MONTREAL
286 St. James Street
Port Dalhousie Phone 1232J

THOS. DREIN & SON COMPANY

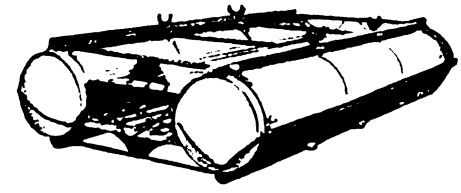
Established 1866

WILMINGTON - - - DELAWARE

We are sole builders of

Patent Beaded Bottom Metallic Life Boats, Life Rafts and Wooden Boats of all kinds.

Outfits for Lake Steamers a specialty.



One Way Only—The Best Way—Buy!

WE SELL OUR SETS

WIRELESS
For Ship and Land Stations

CUTTING & WASHINGTON RADIO CORPORATION
General Offices:
6 and 8 West 48th Street NEW YORK, N. Y.

LANE LIFE BOATS

C. M. LANE LIFE BOAT CO.,

250 HURON ST. BROOKLYN, N.Y.

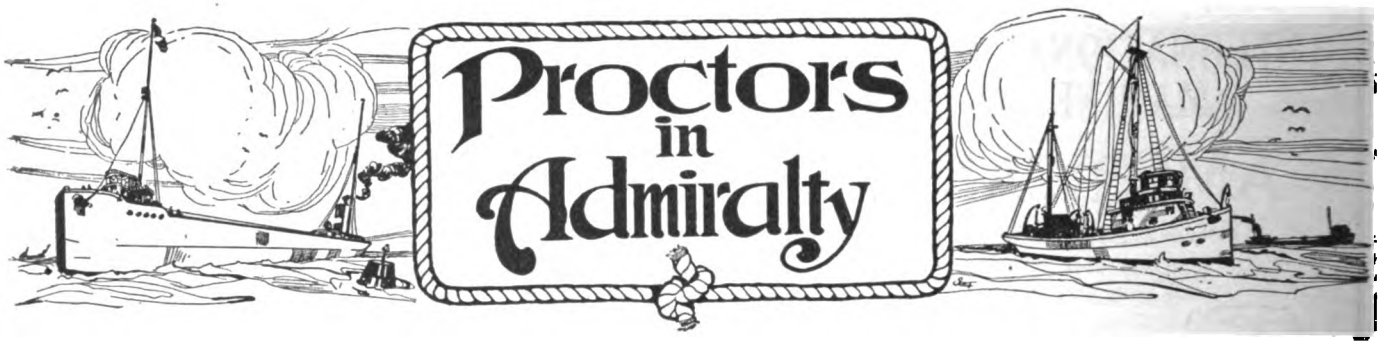
LAST LONGEST

Tarpaulins, Lighter Covers and Awnings

HATCH COVERS, HATCH TENTS, WINDSAILS, BOAT COVERS, Etc.
And All Steamship Canvas Work CANVAS FOR SHIPS

ARTHUR F. SMITH CO., Inc. 261-7 CANAL STREET, NEW YORK CITY
Phone Canal 9606-7-8

Digitized by Google



This directory is maintained for the benefit of vessel owners and operators who occasionally require the counsel and service of experienced Admiralty Proctors.

Wendell P. Barker
Lester B. Donahue
Ira L. Anderson
George W. Wylie
Richard K. McGonigal
Louis J. Wolff

BARKER, DONAHUE, ANDERSON & WYLIE

ATTORNEYS AT LAW
27 Williams Street
NEW YORK CITY, NEW YORK
ADMIRALTY AND INSURANCE LAW

Albert B. Davidson Roberts P. Hudson

DAVIDSON & HUDSON

ATTORNEYS AT LAW
Proctors in Admiralty
Sault Ste. Marie - - - - - Michigan

C. E. KREMER,

COUNSELOR AT LAW AND
PROCTOR IN ADMIRALTY
Suite 1012-1016 Insurance Exchange Building
CHICAGO, ILL.

GOULDER, WHITE & GARRY

LAW OFFICES
Rockefeller Building CLEVELAND, O.

Spencer & Spencer

ATTORNEYS AT LAW
PROCTORS IN ADMIRALTY
Alworth Building, Duluth, Minn.

S. H. HOLDING, F. S. MASTEN, T. H. DUNCAN, and F. L. LECKIE

HOLDING, MASTEN, DUNCAN & LECKIE

ATTORNEYS AT LAW AND
PROCTORS IN ADMIRALTY
840-848 Rockefeller Building CLEVELAND, O.

STOVER & STOVER

ATTORNEYS AT LAW AND
PROCTORS IN ADMIRALTY
JAMES H. STOVER
PAUL STOVER
JOHN S. STOVER
DANIEL G. STOVER
HARNEY B. STOVER
Wells Building,
MILWAUKEE

Hermon A. Kelley Geo. Wm. Cottrell

KELLEY AND COTTRELL

LAW OFFICES
1548 Rockefeller Building
CLEVELAND, OHIO

WARREN, CADY, LADD & HILL

ATTORNEYS AT LAW AND PROCTORS
IN ADMIRALTY
Charles B. Warren
William B. Cady
Sanford W. Ladd
Joseph G. Hamblen, Jr.
Sherwin A. Hill
Claudius B. Grant, Counsel
Union Trust Building, Detroit

The time for you to talk to the vessel owner about your services is when his mind is free from the cares of the day.

506

Do you handle Admiralty cases?
Yes?
Why not do a little talking—you can handle more? You have a vast field of prospects, **BUT**, what are you doing to introduce yourself to them?

503

Digitized by Google

KELLER

HOW ABOUT TIME YOUR MEN LOSE WAITING FOR REPAIRS?

THE individual workman is not to blame for the time lost while waiting for repairs on inferior tools. The foreman is not to blame for the occasional decrease in his output when he is denied first-grade equipment.

KELLER-MADE MASTER-BUILT PNEUMATIC TOOLS save time for the workman, increase output for the foreman and cut down expense generally by converting non-productive time into productive labor. There's a KELLER-MASTER TOOL for every purpose—and every KELLER-MASTER TOOL is the best for the purpose. Write our nearest branch office for particulars.

KELLER PNEUMATIC TOOL CO.

Factory: Grand Haven, Michigan, U. S. A.
Sales Offices: 20 E. Jackson Blvd., Chicago.
Branch Offices:
Birmingham, Boston, Buffalo, Cleveland, Denver, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Richmond, Salt Lake City, Seattle, San Francisco, St. Louis, St. Paul, Los Angeles, Portland, Washington.

PERFECTION

Lettering and Drawing Pen

The most simple and most efficient lettering pen for freehand lettering It writes with a steady, smooth velvety touch.

It's Different! Try It!

If you want comfort, speed and efficiency in lettering, try the PERFECTION. Eliminates that constant refilling and cleaning. The PERFECTION is the only lettering pen that actually solves the lettering problem.

Made in eight sizes to suit all requirements. Write for circular No. G.

Manufactured solely by

New York Blue Print Paper Co.

Sensitized Papers, Drawing Material, Drafting Furniture

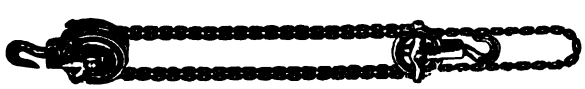
102 Reade Street NYB **New York City**

CLINTON E. HOBBS CO.

Boston, Mass.

Manufacturers

Chains and Chain Hoists



All Kinds and Sizes

FOR AGENCY IN FRANCE

D. QUERTIER

Ship Owner and Shipping Agent

Chartering, Forwarding, Insurance

Carrier by Water and Stevedore

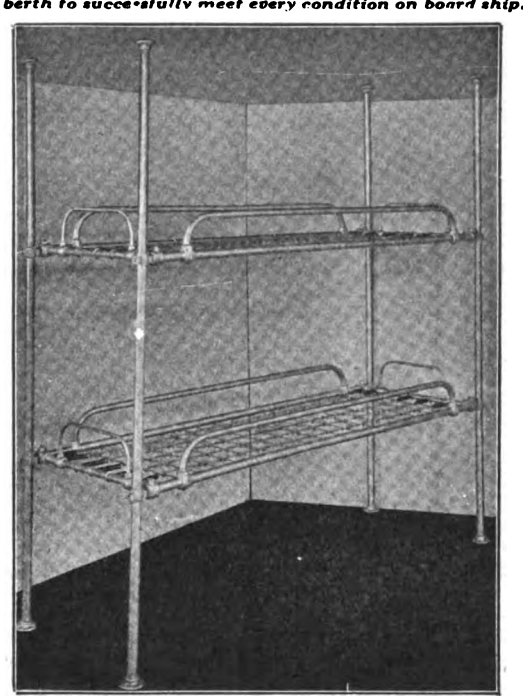
Head Offices: ROUEN

Telegrams: TRANSPORTS

Also at PARIS and HAVRE

BERNSTEIN METAL BERTHS

offer a complete, practical and efficient line. A berth to successfully meet every condition on board ship.

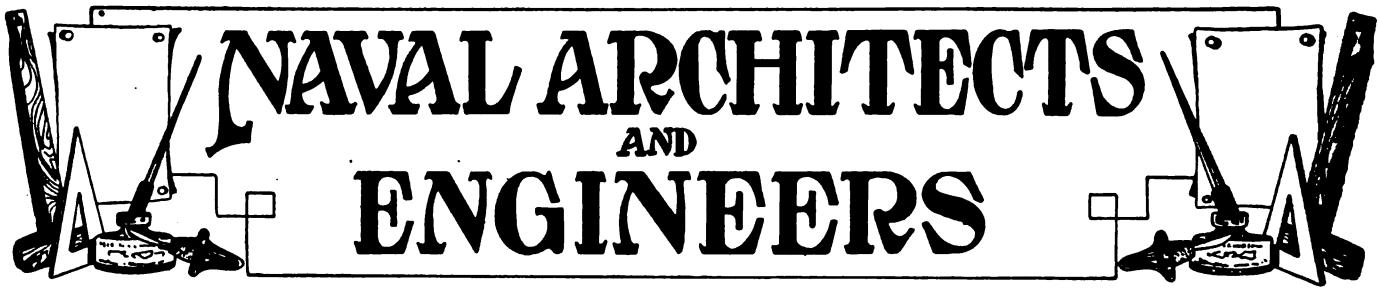


Bernstein No. 5553 Third Class Steerage and Crew Berths.

Write for catalog No. 17 descriptive of Bernstein Berths, Ship Beds, Bedding and Metal Furniture.

Department R **Bernstein** 3rd and Allegheny Avenue Philadelphia, Pa.

Digitized by Google



To Vessel Owners and Operators: You'll find here the announcements of several Naval Architects and Engineers who are reliable, waiting to be of service to you.

COX & STEVENS

Naval Architects Marine Engineers
Vessel Brokers

15 WILLIAM ST. NEW YORK CITY
Tel. 1375 Broad.

LESLIE-STEVENS CO., Inc.

Consulting *Contracting*

Specialists in Modern Electrical and Mechanical Equipment of Yards and Docks — Revamping

"Safety First" Installations A Specialty

120 Broadway New York

WILLIAM T. DONNELLY

Designer of Floating Dry Docks, Steel and Wood.
PLANS ON HAND FOR DOCKS FROM 2,000 TO 20,000 TONS
Electricity applied to Marine Transportation
Harbor Improvements
Consulting Engineer and Naval Architect
17 Battery Place NEW YORK

JOHN REID & COMPANY

NAVAL ARCHITECTS

17 BATTERY PLACE ::: NEW YORK

Offices: London Glasgow Montreal

Thirty Years' Actual Experience in Designing Steel and Wooden Commercial Vessels is Your Guarantee

Write for Our Commercial Booklet

Gielow & Orr

NAVAL ARCHITECTS MARINE ENGINEERS
SHIP BROKERS

52 Broadway NEW YORK CITY Broad 4673

The Watson Engineering Co.

This organization offers able and experienced service on the design and construction of floating equipment in wood, steel, and concrete, docks, yards, warehouses, and all other marine structures.

Hippodrome Building—Cleveland

WILLIAM F. GOODRICH

ARCHITECT & INTERIOR DESIGNER

DESIGNED AND SUPERVISED CONSTRUCTION OF INTERIOR OF S. S. NORTH AMERICAN OF THE CHICAGO, DULUTH & GEORGIAN BAY TRANSPORTATION CO. SOMETHING DIFFERENT IN DESIGN AND CONSTRUCTION.

251 EQUITY BUILDING DETROIT, MICH.

A New Book for Marine Engineers

Whether you are the chief engineer, the assistant, the marine fireman, the machinist or a student you should have a copy of

Marine Engineer's Guide

This book tells in a plain understandable way all about the operation and care of marine engines, boilers and all kinds of auxiliary machinery.

It is packed full of the kind of helpful information about marine engineering that you need in your work every day. Only $3.00 a copy. Send your order today direct to

The Penton Publishing Company
Penton Building Cleveland, Ohio

422

PATENTS

TRADEMARKS AND COPYRIGHTS

Thirty years' active practice. Experienced, personal, conscientious service. All business strictly confidential.

SIGGERS & SIGGERS
PATENT LAWYERS
Suite 11, National Union Ins. Bldg., Washington, D. C.

When you think of books, think of Penton.
We can supply any book in print.

Penton Publishing Co.
Penton Bldg. Cleveland, Ohio

515

Digitized by Google

NOTICE

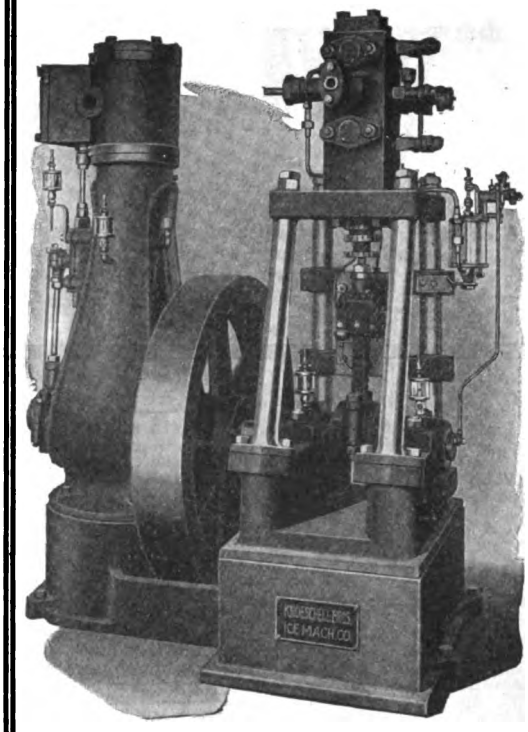
To Emergency Fleet Corporation Shipbuilders Installing Turbine Units

The McNab "LOGOMETER" is an instrument specially designed for, and is approved by, the Engineering Section of the Emergency Fleet Corporation for installation in the Engine Room under

Technical Order No. 104.

For particulars apply to

THE McNAB COMPANY, BRIDGEPORT, CONN.
or
FORD & GEIRRINE, SAN FRANCISCO, CALIF.



Absolute Safety

Highest Efficiency

Least Bulk and Weight

This equipment answers all possible requirements.

KROESCHELL CARBONIC ANHYDRIDE REFRIGERATING EQUIPMENT is in use on the following Lake Vessels:

North American; South American; Northland; Sesandbee; City of Cleveland; Detroit III; Tionesta; Juniata; Octorara; Harvester; Norenic; Rochester; Hamonic; Toronic; Arthur Orr; Minnesota; J. H. C. Hagerty; Gerenta; Alabama; Nevada and others.

May we send you our literature?

KROESCHELL BROS. ICE MACHINE CO.
New York City CHICAGO Detroit, Mich.

ST. LAWRENCE MARINE RAILWAY COMPANY
OGDENSBURG, N. Y.

Carriage accommodates every ship of Welland Canal size,

Fully equipped for repairs to Wood and Steel boats.

BOILER AND MACHINE SHOP
HIGH CLASS WORK

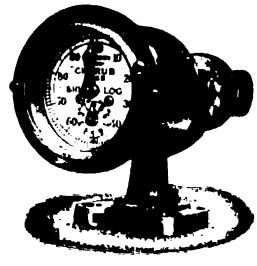
Shipbuilding Cranes
Steel Barges
Steel Tow-Boats
Steel Derrick Boats

Dravo Contracting Co.
(Engineering Works Dept.)

Address inquiries to

Dravo-Doyle Co., Representatives
Pittsburgh, Pa.
Cleveland, Philadelphia, Chicago, Indianapolis, San Francisco

Walker's Patent Ship-Logs



Walker's Patent "Cherub" II Ship-Log

Are Known Throughout the World for Their Accuracy and Durability

UNSOLICITED TESTIMONIAL

"I have much pleasure in stating that your Cherub Log has been in constant service for a period of over four years, and has given no trouble whatever. It has during that period registered some 190,000 miles and I have no doubt this is the finest Log in the market at the present time."

Thomas Walker & Son, Ltd.
Makers to the British and Many Other Navies
58 Oxford St. Birmingham, Eng.

Digitized by Google

"Where-To-Buy"

A classified-by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶ Index to advertisements will give you page number of any advertiser and by referring to advertisement you can get full particulars about products.

ACETYLENE
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.

ACETYLENE (Dissolved)
Air Reduction Sales Co., 120 Broadway, New York

ACETYLENE IN CYLINDERS
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Oxweld Acetylene Co., Newark, N. J.
Prest-O-Lite Co., Inc., 30 E. 42nd St., N. Y. C.

AIR HOSE
Electric Hose & Rubber Co., Wilmington, Del.

AIR PORTS
Rostand Mfg. Co., The, Milford, Conn.

AIR TOOLS
Chgo. Pneumatic Tool Co., 1097 Fisher Bldg., Chgo.
Cleveland Pneumatic Tool Co., Cleveland, O.
Oldham, Geo., & Son, Co., Frankford, Phila., Pa.
Parish Sup. & Mfg. Co., 2848 Quinn St., Chicago

ANCHOR HOISTS
Superior Iron Works Co., Superior, Wis.

ANCHORS
Admiral Anchor Co.,
Franklin Bank Bldg., Philadelphia, Pa.
American Engineering Co., Philadelphia, Pa.
Baldt Anchor Company,
6th and Butler Sts., Chester, Pa.
American Steel Foundries, Chicago, Ill.
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.
Galbraith, C. C., & Son, 47-49 West St., New York.
Malleable Iron Fittings Co., Branford, Conn.
Marine Hardware Equipment Co.,
South Portland, Maine.
Thacher Propeller & Foundry Corp., Albany, N. Y.

ANGLE BEVELING AND PLANING MACHINES
Thomas Spacing Machine Co., Pittsburgh, Pa.

APPLIANCES (Electrical)
Benjamin Electric Mfg. Co., Chicago, Ill.

ARCHITECTS (Naval)
Cox & Stevens, 15 William St., New York, N. Y.
Goodrich, William F., 251 Equity Bldg., Detroit.
Donnelly, Wm. T., 17 Battery Place, New York.
Gielow & Orr, 52 Broadway, New York City.
Reid, John, & Co., 30 Church St., New York.

ARC WELDING
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Wilson Welder & Metals Co.,
2 Rector St., New York City.

ARMOR (Submarine)
Morse, A. J., & Son, Boston, Mass.

ASH CONVEYORS (Steam Jet)
Hagan Corp., The, Peoples Bk. Bldg., Pittsburgh.

ATTACHING PLUGS
Benjamin Electric Mfg. Co., Chicago, Ill.

ATTORNEYS AND PROCTORS IN ADMIRALTY
Barker, Donahue, Anderson & Wylie,
27 William St., New York City.
Davidson & Hudson, Sault Ste. Marie, Mich.
Goulder, White & Garry, Cleveland, O.
Holding, Marten, Duncan & Leckie,
840-848 Rockefeller Bldg., Cleveland.
Kelley & Cottrell,
1548 Rockefeller Bldg., Cleveland, O.
Kremer, C. E., 1012-1016 Ins. Exch. Bldg., Chgo.
Siggers & Siggers, Nat'l U. Ins. Bldg., Wash., D. C.
Spencer & Spencer,
1102-3 Alworth Bldg., Duluth, Minn.
Stover & Stover, Wells Bldg., Milwaukee, Wis.
Warren, Cady, Ladd & Hill, Un. Tr. Bldg., Detroit.

AUTOMATIC FIRE ALARM
Fire Detecting Wire Co., Inc.,
2 West 45th St., New York City.

BABBITT METALS
Cramp, Wm., & Sons Ship & Engine
Building Co., Philadelphia, Pa.

BAND SAWS (Adjustable Bevel)
Power, L., Co., 3 So. 23rd St., Philadelphia.

BARGES (Steel and Wood)
Northwest Engineering Works, Green Bay, Wis.

BARS (Iron and Steel)
Milton Mfg. Co., Milton, Pa.
Trout, H. G., Company, King Iron Works,
Buffalo, N. Y.

BEARINGS (Thrust)
Albert Kingsbury, 532 Oliver Bldg., Pittsburgh, Pa.

BEDDING
Bernstein Mfg. Co., 3d St. and Alle. Ave., Phila.

BEDSTEADS
Bernstein Mfg. Co., 3d St. and Alle. Ave., Phila.

BELLS (Electrical and Mechanical)
Benjamin Electric Mfg. Co., Chicago, Ill.
Cory, Chas., & Son, Inc.,
290 Hudson St., New York, N. Y.

BELTING (Rubber)
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.

BENDING AND STRAIGHTENING MACHINERY
United Engineering & Foundry Co., Pittsburgh, Pa.

BERTHS, BUNKS AND BEDS (Metal)
Bernstein Mfg. Co., 3d St. and Alle. Ave., Phila.

BEVELED FILLERS
Irving Iron Works Co., New York, N. Y.

BILGE SYPHONS
Schutte & Koerting Co., Philadelphia, Pa.

BINNACLES
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.
Ritchie, E. S., & Sons, Brookline, Mass.

BITTS (Cast Iron)
Central Foundry Co.,
90 West St., New York City.
Thacher Propeller & Fury. Corp., Albany, N. Y.

BLOCKS
Boston & Lockport Block Co.,
124 Condor St., E. Boston, Mass.
Marine Decking & Supply Co.,
1011 Chestnut St., Philadelphia, Pa.
Marine Hardware Equipment Co.,
South Portland, Maine.
McMillan's, W. H., Sons,
153 South St., New York City.
Parish Supply & Mfg. Co.,
2848 Quinn St., Chicago, Ill.

BLOCKS (Chain Pulley)
Chisholm-Moore Mfg. Co., The, Cleveland, Ohio.

BLOCKS (Wire and Manila Rope)
Leshens, A., & Sons Rope Co., St. Louis, Mo.

BLOWERS
American Blower Co., Detroit, Mich.
Howden, James & Co., Ltd., Wellsville, N. Y.
Reid, John & Co., 30 Church St., N. Y. C.

BLOWERS (Flue)
American Ship Building Co., Cleveland, O.

BLOWERS (Soot)
Diamond Power Specialty Co., Detroit, Mich.

BOATS
Dravo-Doyle Co., Pittsburgh, Pa.

BOATS (River)
Ward, Charles, Engineering Works,
Charleston, W. Va.

BOILERS
Consolidated Shipbuilding Corp., New York City.

BOILER CIRCULATORS
Dew Valve Co., Inc.,
149 Broadway, New York, N. Y.

BOILER CLEANING DEVICES
Geyser Boiler Ap. Co., 661 Atwater St., Detroit.

BOILER HEADS
Lukens Steel Co., Coatesville, Pa.

BOILER NOZZLES (Welded Steel)
Continental Iron Works, The,
West and Calyer Sts., Brooklyn, N. Y.

BOILER RIVETS
American Flexible Bolt Co.,
50 Church St., New York, N. Y.
Oliver Iron & Steel Co.,
10th and Muriel Sts., Pittsburgh, Pa.
Severance, S., Mfg. Co., Glassport, Pa.

BOILER ROOM FITTINGS
Crane Co., The, 836 S. Michigan Ave., Chicago.

BOILER SETTINGS (Cement)
Quigley Furnace Specialties Co., Inc.,
26 Courtlandt St., New York City.

BOILER STEAM AND WATER DRUMS (Welded)
Continental Iron Works, The,
West and Calyer Sts., Brooklyn, N. Y.

BOILERS (Marine)
Almy Water Tube Boiler Co., Providence, R. I.
American Ship Building Co., Cleveland, O.
Babcock & Wilcox Co., New York, N. Y.
Badenhausen Company,
1425 Chestnut St., Philadelphia, Pa.
Ballin Water Tube Boiler Co.,
E. Oak and E. Water Sts., Portland, Oreg.
Baltimore Dry Dock & Shipbuilding Co.,
Locust Point, Baltimore, Md.
Bridgeport Boiler Works, The,
Housatonic St., Bridgeport, Conn.
Chicago Ship Bldg. Co., So. Chicago, Ill.
Collingwood Ship Bldg. Co., Ltd., Collingwood, Ont.
Commercial Boiler Works, The, Seattle, Wash.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
DePere Mfg. Co., Chicago, Ill.
Detroit Ship Building Co., Detroit, Mich.
Fletcher, W. & A. Co., Hoboken, N. J.
Great Lakes Engineering Works, Detroit, Mich.
Heine Safety Boiler Co.,
5325 Marcus Ave., St. Louis, Mo.
Howden, James & Co., Ltd., Wellsville, N. Y.
Lake Erie Boiler Works, Buffalo, N. Y.
Manitowoc Ship Building Co., Manitowoc, Wis.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Milwaukee Dry Dock Co., Milwaukee, Wis.
New York Eng. Co., 2 Rector St., N. Y. C.
Oldman Boiler Wks., 36-40 Illinois St., Buffalo.
Pioneer Boiler Works,
Bard and Merchant Sts., Port Huron, Mich.
Sun Shipbuilding Co., Chester, Pa.
Superior Ship Bldg. Co., Superior, Wis.
Traylor Engineering & Mfg. Co., Allentown, Pa.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Toledo Ship Building Co., Toledo, O.
Ward, Chas., Engrg. Wks., Charleston, W. Va.
Wickes Boiler Co., Saginaw, Mich.

BOILERS (Stationary Water Tube)
Badenhausen Company,
1425 Chestnut St., Philadelphia, Pa.
Heine Safety Boiler Co.,
5325 Marcus Ave., St. Louis, Mo.
Ward, Charles, Engineering Works,
Charleston, W. Va.

BOILERS (Water Tube)
Almy Water Tube Boiler, Providence, R. I.
Badenhausen Company,
1425 Chestnut St., Philadelphia, Pa.
Ballin Water Tube Boiler Co.,
E. Oak and E. Water Sts., Portland, Oreg.
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Bridgeport Boiler Works, The,
Housatonic St., Bridgeport, Conn.
New York Eng. Co., 2 Rector St., N. Y. C.
Ward, Chas., Engrg. Wks., Charleston, W. Va.
Wickes Boiler Co., Saginaw, Mich.

BOILER TUBES
Detroit Seamless Steel Tube Co., Detroit, Mich.
Tyler Tube & Pipe Co., The, Washington, Pa.

BOLT ROPE (Manila)
Whitlock Cordage Co., New York, N. Y.

BOLTS AND NUTS
Milton Mfg. Co., Milton, Pa.
Oliver Iron & Steel Co.,
10th and Muriel Sts., Pittsburgh, Pa.

BOLTS (Eye and Drop)
Marine Hardware Equipment Co.,
South Portland, Maine.

BOOKS
Penton's Book News, Cleveland, O.

BOOMS
Western Spar Co., 910 Yeon Bldg., Portland, Ore.

BRASS GOODS AND SPECIALTIES
Detroit Ship Building Co., Detroit, Mich.
Lunkenheimer Co., The, Cincinnati, O.

BRAZING OUTFITS—See TORCHES, BURNERS AND BRAZING OUTFITS (Acetylene, Blow, Oxy-Acetylene)

BROKERS (Vessel)
Boland & Cornelius, 1204 Prudential Bldg., Buffalo
Farley, Edward P., Co., Chicago, Ill.
Gielow & Orr, 52 Broadway, New York City.
Richardson, W. C., & Co.,
816-818 Leader-News Bldg., Cleveland.

BRUSHES (Vulcan Rubber Cemented)
Whiting, John L.-Adams, J. J., Co., Boston, Mass.

BUCKETS
Browning Company,
16226 Waterloo Rd., Cleveland, O.

BUCKETS (Clam Shell)
Browning Company,
16226 Waterloo Rd., Cleveland, O.

BURNERS (Acetylene)—See TORCHES, BURNERS AND BRAZING OUTFITS (Acetylene, Blow, Oxy-Acetylene)

Digitized by Google

QUALITY SERVICE

RELIABILITY EFFICIENCY

SUN MARINE OILS

HAVE PROVED THEIR WORTH

Good Ships Deserve Good Oils

Let Our Engineers Solve Your Engine Room Troubles

Sun Company

1428 So. Penn Square PHILADELPHIA, PA.

STOCKS CARRIED AT

New York City Boston Philadelphia Baltimore Pittsburgh Cincinnati Buffalo St. Louis
Chicago Minneapolis Toledo Newark Newport News Detroit Atlanta New Orleans Sabine

Digitized by Google

BUTTONS (Water Tight, Push)
Benjamin Electric Mfg. Co., Chicago, Ill.

CABLES
Waterbury Co., 63 Park Row, New York City.
Western Electric Co.,
195 Broadway, New York City.
Whitlock Cordage Co., New York, N. Y.

CALCIUM
Air Reduction Sales Co., 120 Broadway, New York

CALKING COTTON
Stratford, Geo., Oakum Co.,
165 Cornelison Ave., Jersey City, N. J.
Turner, Halsey Co., 62 Leonard St., New York City

CALKING HAMMERS (Pneumatic)
Cleveland Pneumatic Tool Co., Cleveland, O.
Indepen. Pneu. Tool Co., 600 Jackson Blvd., Chgo.
Ingersoll-Rand Co., 11 Broadway, New York City.

CAM SHAFTS
Camden Frg. Co., 8th and Bulson Av., Camden, N. J.

CANVAS
Smith, Arthur F., Co., Inc.,
261-267 Canal St., New York, N. Y.

CANVAS, ROOFINGS
Robeson Preservo Co.,
401 White Block, Port Huron, Mich.

CAPSTANS
American Engineering Co., Philadelphia, Pa.
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.
Chase Mach. Co., The, 2313 Elm St., N. W., Clevd.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Water Street, Bath, Maine.
Superior Iron Works Co., Superior, Wis.

CARDED OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

CARGO WINCHES (Steam and Electric)
Hyde Windlass Co., Water Street, Bath, Maine.

CASTINGS
Atlas Steel Casting Co., Buffalo, N. Y.
Collingwood Ship Bldg. Co., Collingwood, Ont.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Crane Co., The, 836 S. Michigan Ave., Chicago.
Great Lakes Engineering Works, Detroit, Mich.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Hooven, Owens, Rentschler Co., Hamilton, O.
Mesta Machine Co., Homestead, Pa.
National Foundry Co., Erie, Pa.
National Foundry Co.,
15th & Raspberry Sts., Erie, Pa.
Sun Shipbuilding Co., Chester, Pa.
Superior Iron Works Co., Superior, Wis.
Thacher Propeller & Foundry Corp., Albany, N. Y.
Trout, H. G., Company, King Iron Works,
Buffalo, N. Y.
United Engineering & Foundry Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CASTINGS (Bronze)
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Hooven, Owens, Rentschler Co., Hamilton, O.

CASTINGS (Gray Iron)
Champion Engr. Co., Kenton, Ohio.

CASTINGS (Steel)
American Steel Foundries, Chicago, Ill.
Atlas Steel Casting Co., Buffalo, N. Y.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Mesta Machine Co., Homestead, Pa.
National Foundry Co.,
15th & Raspberry Sts., Erie, Pa.
National Foundry Co., Erie, Pa.

CEMENT (High Temperature)
Quigley Furnace Specialties Co., Inc.,
26 Courtlandt St., New York City.

CHAINS
American Chain Co., Inc., Bridgeport, Conn.
Baldt Anchor Company,
6th and Butler Sts., Chester, Pa.
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.
Hobbs, Clinton E., Co., Boston, Mass.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

CHAINS (Marine)
American Chain Co., Inc., Bridgeport, Conn.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

CHAINS (Ship Cable)
American Chain Co., Inc., Bridgeport, Conn.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

CHAINS (Steering Gear)
American Chain Co., Inc., Bridgeport, Conn.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

CHAINS (Stud Link)
American Chain Co., Inc., Bridgeport, Conn.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

CHIPPING HAMMERS (Pneumatic)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Cleveland Pneumatic Tool Co., Cleveland, O.

CHISEL BLANKS (Pneumatic)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Cleveland Pneumatic Tool Co., Cleveland, O.
Indepen. Pneu. Tool Co., 600 Jackson Blvd., Chgo.
Parish Sup. & Mfg. Co., 2848 Quinn St., Chicago

CHOCKS
Thacher Propeller & Foundry Corp., Albany, N. Y.

CHOCKS (Cast Iron)
Central Foundry Co., 90 West St., New York City

CHRONOMETERS
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.

CIRCULATORS (Boiler)
McNab Co., Bridgeport, Conn.

CLASSIFICATION SOCIETY
American Bureau of Shipping, New York City.

CLINCH RINGS
Malleable Iron Fittings Co., Branford, Conn.

COAL HANDLING MACHINERY (See Machinery, Coal Handling)

COAL (Producers and Shippers)
Hall, Geo., Coal & Trans. Co., Ogdensburg, N. Y.
Hanna, M. A., & Co., Cleveland, O.
Loain Coal & Dock Co., Columbus, O.
Pickands, Mather & Co., Cleveland, O.

COATINGS
Amer. Bitumastic Enam. Co., 17 Battery Pl., N.Y.C.

COLLECTIONS
Box 69, Windsor, Ont., Can.

COLUMNS (Water)
Anderson, The V. D., Co., Cleveland, O.

COMPASSES
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.
Ritchie, E. S., & Sons, Brookline, Mass.
Sperry Gyroscope Co., Brooklyn, N. Y.

COMPRESSORS (Air)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Hooven, Owens, Rentschler Co., Hamilton, O.
Kroeschell Bros., Ice Machine Co., Chicago, Ill.
Norwalk Iron Works Co., South Norwalk, Conn.

COMPRESSORS (Gas)
Norwalk Iron Works Co., South Norwalk, Conn.

CONDENSERS
Great Lakes Engineering Works, Detroit, Mich.
Traylor Engineering & Mfg. Co., Allentown, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

CONDENSER SHELLS (Welded Steel)
Continental Iron Works, The,
West and Calyer Sts., Brooklyn, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

CONDENSER TUBES
Hughes-Limbach Co., The,
Hippodrome Bldg., Cleveland, O.
Wheeler Condenser & Engrg. Co., Carteret, N. J.

CONDUIT FITTINGS (Water Tight)
Crouse-Hinds Co., Syracuse, N. Y.
Western Electric Co.,
195 Broadway, New York City.

CONVEYORS
General Electric Co., Schenectady, N. Y.

COOKING APPARATUS
Bramhall, Deane Co.,
263 B. West 36th St., New York City.

CORDAGE
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.

CORDAGE (Manila, Sisal and Other Hard Fiber Rope)
Waterbury Co., 63 Park Row, New York, N. Y.
Whitlock Cordage Co., 46 Church St., New York.

CORK JACKETS AND CORK RINGS
Williams, Wm. E., New York, N. Y.

COTTON
Stratford, Geo., Oakum Co., Jersey City, N. J.

CRANES
Dravo-Doyle Co., Pittsburgh, Pa.

CRANES (Electric Traveling, Jib, Hand)
Champion Engr. Co., Kenton, Ohio.
Chesapeake Iron Works, Baltimore, Md.
Chisholm-Moore Mfg. Co., The, Cleveland, Ohio.
General Electric Co., Schenectady, N. Y.
Milwaukee Elec. Crane & Mfg. Co., Milwaukee.
Shepard Electric Crane & Hoist Co.,
Montour Falls, N. Y.
Wellman-Seaver-Morgan Co., Cleveland, O.
Whiting Foundry Equipment Co., Harvey, Ill.

CRANES (Hydraulic)
United Engineering & Foundry Co., Pittsburgh, Pa.

CRANES (Locomotive)
Milwaukee Elec. Crane & Mfg. Co., Milwaukee.

CUTTING AND WELDING (Electric Arc)
Pioneer Boiler Works,
Bard and Merchant Sts., Port Huron, Mich.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.
Wilson Welder & Metals Co.,
2 Rector St., New York City.

CUTTING AND WELDING (Oxy-Acetylene Process)—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

CYLINDERS (Acetylene)—See ACETYLENE IN CYLINDERS

CYLINDERS (Oxygen)—See OXYGEN IN CYLINDERS

CYLINDERS (Welded)
Continental Iron Works, The, Brooklyn, N. Y.

DAVITS AND DAVIT FALLS
American Balsa Co., Inc.,
50 East 42nd St., New York City

DECK BOLTS
Milton Mfg. Co., Milton, Pa.

DECK SCUTTLES (Cast Iron)
Central Foundry Co., 90 West St., New York City

DECKING (Marine)
Marine Decking & Supply Co.,
1011 Chestnut St., Philadelphia.

DERRICKS
Superior Iron Works Co., Superior, Wis.

DIES
Keller Pneumatic Tool Co., Grand Haven, Mich.

DIE BLOCKS
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

DISTILLING APPARATUS (Water)
Griscom-Russell Co.,
2121 West St. Bldg., New York City.
Schutte & Koerting Co.,
12th and Thompson St., Philadelphia.

DIVING APPARATUS
Leavitt Deep Sea Salvage Co.,
186 Remsen St., Brooklyn, N. Y.
Morse, Andrew L. & Son, Inc.,
221 High St., Boston, Mass.

DRAFT (Artificial and Mechanical for Boilers)
American Blower Co., Detroit, Mich.
American Ship Building Co., Cleveland, O.
Great Lakes Engineering Works, Detroit, Mich.
Howden, James & Co., Ltd., Wellsville, N. Y.
Reid, John, & Co., 30 Church St., New York City.

DRAWING MATERIALS
N. Y. Blue Print & Paper Co.,
102 Reade St., New York

DREDGING MACHINERY
Great Lakes Engineering Works, Detroit, Mich.
Morris Machine Works, Baldwinsville, N. Y.
Superior Ship Building Co., Superior, Wis.

DREDGING OUTFIT CONSTRUCTORS
Buffalo Dry Dock Co., Buffalo, N. Y.
Morris Machine Works, Baldwinsville, N. Y.

DRILL BOAT MACHINERY
Superior Iron Works Co., Superior, Wis.

DRILLS (Air)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Cleveland Pneumatic Tool Co., Cleveland, O.

DRILLS (Electric)
Indepen. Pneu. Tool Co., 600 Jackson Blvd., Chgo.
Ingersoll-Rand Co., 11 Broadway, New York City.
Van Dorn Electric Tool Co., Cleveland, O.

DRILLS (Pneumatic)
Indepen. Pneu. Tool Co., 600 Jackson Blvd., Chgo.
Ingersoll-Rand Co., 11 Broadway, New York City.

DROPS (Wharf)
American Engineering Co., Philadelphia, Pa.

DRY DOCKS
Alabama Dry Dock & Shipbldg. Co., Mobile, Ala.
American Ship Building Co., Cleveland, O.
Baltimore Dry Dock & Shipbuilding Co.,
Locust Point, Baltimore, Md.
Buffalo Dry Dock Co., The, Buffalo, N. Y.
Chicago Ship Building Co., Chicago, Ill.
Collingwood Ship Bldg. Co., Ltd.,
Collingwood, Ont., Can.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Detroit Ship Building Co., Detroit, Mich.
Foundation Co., The, Port Huron Shipyard, Inc.,
Port Huron, Mich.
Great Lakes Engineering Works, Detroit, Mich.
Manitowoc Ship Building Co., Manitowoc, Wis.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Montreal Transportation Co., Ltd.,
Port Dalhousie, Ont., Can.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Sun Shipbuilding Co., Chester, Pa.
Superior Ship Building Co., Superior, Wis.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Toledo Ship Building Co., Toledo, O.

DRY DOCK PACKING
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.

DUCK (Canvas and Cotton)
Turner, Halsey Co.,
62 Leonard St., New York City.

DYNAMOS
General Electric Co., Schenectady, N. Y.

ECCENTRIC SHAFTS
Camden Forge Co., 8th and Bulson, Camden, N. J.
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

EJECTORS
American Injector Co., 176 14th St., Detroit, Mich.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

EJECTORS (Ash)
Great Lakes Engineering Co., Detroit, Mich.
Marine Decking & Supply Co.,
1011 Chestnut St., Philadelphia, Pa.

ELECTRICAL DEVICES
Benjamin Electric Mfg. Co., Chicago, Ill.
Bryant Electric Co., Bridgeport, Conn.
Seidler-Miner Co., 36 Lafayette St., Detroit.

ELECTRICAL EQUIPMENT
American Blower Co., Detroit, Mich.
Benjamin Electric Mfg. Co., Chicago, Ill.
Benson Electric Co., Superior, Wis.
Bryant Electric Co., Bridgeport, Conn.
Crouse-Hinds Co., Syracuse, N. Y.
Engberg's Electric & Mechanical Works,
St. Joseph, Mich.

Digitized by Google

Even for brand new Wireless Problems, the flexible new 3-way Marconi Plan provides ready-made solutions.

FOR now you can rent as of old, you can buy outright, or you can contract with us for Marconi Service. This third possibility is the one that appeals to owners whose Marconi-equipped vessels have been returned to them by the Government.

In its three phases, the new Marconi Plan is at once the most complete and the most flexible solution of today's pressing problems in wireless operation and maintenance. Under any of these arrangements, you get all the value of Marconi development in the apparatus; and because of our special experience and world-wide organization, we have been able to design the service to meet every routine or special need, in home or foreign waters.

And remember — this is ready and in operation NOW. Why make costly experiments when you can, at low cost, shift the entire burden of operation to Marconi?

Ask our nearest office for details

MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA

Woolworth Building, New York

Branch Offices:

Chicago Boston Philadelphia Baltimore Cleveland
New Orleans Seattle San Pedro, Cal. Portland, Ore. Norfolk, Va.
San Francisco Galveston, Texas Savannah, Ga. Honolulu, P. I.

MARCONI

WORLD-WIDE WIRELESS

Digitized by Google

ELECTRICAL EQUIPMENT (Continued)
Livingston, J., & Co., Inc.,
Grand Central Terminal, New York, N. Y.
Seidler-Miner Co., 36 Lafayette St., Detroit.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

ELECTRICAL RECEPTACLES
Bryant Electric Co., Bridgeport, Conn.
Seidler-Miner Co., 36 Lafayette St., Detroit.

ENAMELS (Marine, Exterior, Interior)
American Bitumastic Enamels Co.,
17 Battery Place, New York City.
Natroce Paint & Varnish Works, Tonawanda, N. Y.

ENGINEERS AND CONTRACTORS
Chesapeake Iron Works, Baltimore, Md.
Hooven, Owens, Rentschler Co., Hamilton, O.
United Engineering & Foundry Co., Pittsburgh, Pa.

ENGINEERS (Marine, Mechanical and Consulting)
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
Crandall Engineering Co., 102 Border St., Boston
Donnelly, Wm. T., 17 Battery Pl., N. Y. C.
Great Lakes Engineering Works, Detroit, Mich.
Griscom-Russell Co., New York, N. Y.
Leslie-Stevens Co., Inc., 120 Broadway, New York
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Superior Iron Works Co., Superior, Wis.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Watson Engineering Co., Cleveland, O.

ENGINEERS' SPECIALTIES
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.
Lunkenheimer Co., The, Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.

ENGINES
American Blower Co., Detroit, Mich.
Bay State Iron Works Corp.,
366 Fifth Ave., New York City.
Enberg's Electric & Mechanical Works,
St. Joseph, Mich.
Hooven, Owens, Rentschler Co., Hamilton, O.
Kingsford Fdry. & Machine Works, Oswego, N. Y.
Morris Machine Works, Baldwinsville, N. Y.
Reid, John & Co., 30 Church St., N. Y. C.
Superior Iron Works, Superior, Wis.
Superior Iron Works Co., Superior, Wis.
United Engineering & Foundry Co., Pittsburgh, Pa.
Worthington Pump & Machinery Corp.,
115 Broadway, New York City.

ENGINES (Corliss)
Hardie-Tynes Mfg. Co., Birmingham, Ala.

ENGINES (Diesel)
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
New London Ship & Engine Co., Groton, Conn.
Trout, H. G., Co., King Iron Works,
Buffalo, N. Y.

ENGINES (Gas)
Consolidated Shipbuilding Corp., New York City.
Worthington Pump & Machinery Corp.,
115 Broadway, New York City.

ENGINES (Marine)
American Ship Building Co., Cleveland, O.
Bay State Iron Works Corp.,
366 Fifth Ave., New York City.
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Chicago Ship Bldg. Co., So. Chicago, Ill.
Collingwood Ship Building Co., Ltd.,
Collingwood, Ont., Can.
Consolidated Shipbuilding Corp., New York City.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Detroit Ship Building Co., Detroit, Mich.
Fletcher, W. & A., Co., Hoboken, N. J.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Hooven, Owens, Rentschler Co., Hamilton, O.
McDougall-Duluth Co., Duluth, Minn.
Manitowoc Ship Building Co., Manitowoc, Wis.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Morris Machine Works, Baldwinsville, N. Y.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Sun Shipbuilding Co., Chester, Pa.
Superior Iron Works Co., Superior, Wis.
Superior Ship Building Co., Superior, Wis.
Traylor Engineering & Mfg. Co., Allentown, Pa.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Toledo Ship Building Co., Toledo, O.
Trout, H. G., Co., King Iron Works,
Buffalo, N. Y.
Ward, Chas., Engrg. Works, Charleston, W. Va.
Worthington Pump & Machinery Corp.,
115 Broadway, New York City.

ENGINES (Oil)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
New London Ship & Engine Co., Groton, Conn.
United Engineering & Foundry Co., Pittsburgh, Pa.
Worthington Pump & Machinery Corp.,
115 Broadway, New York City.

ENGINES (Propelling)
Vulcan Iron Works, Inc., Jersey City, N. J.
Worthington Pump & Machinery Corp.,
115 Broadway, New York City.

EUROPEAN STEAMSHIP LINES (Passenger and Freight)
International Mer. Marine Co., 9 B'way, N. Y. C.

EVAPORATORS
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.
Schutte & Koerting Co., Philadelphia, Pa.

EXHAUST HEADS
Wright-Austin Co., Detroit, Mich.

EXPANSION JOINTS
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.

EYE BOLTS
Milton Mfg. Co., Milton, Pa.

FANS (Electric)
American Blower Co., Detroit, Mich.

FANS (Turbine Driven)
Kerr Turbine Co., Wellsville, N. Y.

FENDERS
Kahnweiler's Sons, David, New York, N. Y.

FILLET (Paper)
Trosco Mfg. Co., Cleveland, O.

FILTERS (Feed Water)
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.

FILTERS (Oil)
Anderson, The V. D., Co., Cleveland, O.

FIRE ALARM SYSTEMS
Cory, Chas., & Sons, New York, N. Y.

FIRE DETECTING SYSTEM
Fire Detecting Wire Co., Inc.,
2 West 45th St., New York, N. Y.

FIREPROOF OAKUM
Stratford, Geo., Oakum Co. Jersey City, N. J.

FITTINGS (Pipe)
Mark Mfg. Co., 1901 Dempster St., Evanston, Ill.

FIXTURES
General Electric Co., Schenectady, N. Y.
Seidler-Miner Co., 36 Lafayette St., Detroit.

FIXTURES (Marine Lighting)
Benjamin Electric Mfg. Co., Chicago, Ill.
Bryant Electric Co., Bridgeport, Conn.

FLANGES
Crane Co., The, 836 S. Michigan Ave., Chicago.

FLOOR GRATINGS
Irving Iron Works Co., Long Island City, N. Y.

FLOOD LAMPS
Western Electric Co., 195 Broadway, N. Y. C.

FLOOD LIGHT PROJECTORS—See PROJECTORS (Electric Flood Light)

FLUE BENDING HAMMERS (Pneumatic)
Independent Pneumatic Tool Co.,
600 Jackson Blvd., Chicago, Ill.

FORGE BLOWERS (Jet)
Schutte & Koerting Co., Philadelphia, Pa.

FORGING INGOTS
Mesta Machine Co., Homestead, Pa.

FORGING MACHINERY
United Engineering & Foundry Co., Pittsburgh, Pa.

FORGINGS (Alloy Steel)
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

FORGINGS (Drop)
Marine Hardware Equipment Co.,
South Portland, Maine.
Parish Supply & Mfg. Co.,
2848 Quinn St., Chicago, Ill.
Williams, J. H., & Co., Brooklyn, N. Y.

FORGINGS (Iron and Steel)
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
Baldt Anchor Company,
6th and Butler Sts., Chester, Pa.
Camden Forge Co.,
8th and Bulson Ave., Camden, N. J.
Collingwood Ship Bldg. Co., Ltd.,
Collingwood, Ont., Can.
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Oliver Iron & Steel Co.,
10th and Muriel Sts., Pittsburgh, Pa.
Savage Arms Corp., Sharon, Pa.
U. S. Chain & Forging Co.,
211 Union Arcade, Pittsburgh, Pa.

FOUNDERS
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
American Blower Co., Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
Marine Iron & Shipbuilding Co., Duluth, Minn.
Sun Shipbuilding Co., Chester, Pa.
Todd Shipyards Corp.,
15 Whitehall St., New York City.

FOUNDRY EQUIPMENT
American Blower Co., Detroit, Mich.
Wellman-Seaver-Morgan Co., Cleveland, O.
Whiting Foundry Equipment Co., Harvey, Ill.

FREIGHT HANDLING EQUIPMENT
Lidgerwood Mfg. Co., New York City.

FRICTION BOARD
Stratford, Geo. Oakum Co.,
165 Cornelison Ave., Jersey City, N. J

FUEL OIL
Texas Company, 17 Battery Place, New York City.

FUELING COMPANIES AND COAL DEALERS
Hall, Geo., Coal & Transportation Co.,
Ogdensburg, N. Y.
Hanna, M. A., & Co., Cleveland, O.
Lorain Coal & Dock Co., Columbus, O.
Pickands, Mather & Co., Cleveland, O.

FURNACE BRIDGE WALLS
Wager, Robert H., Singer Bldg., New York.

FURNACE FRONTS AND DOORS
Continental Iron Works, The,
West and Calyer Sts., Brooklyn, N. Y.
Howden, James & Co., Ltd., Wellsville, N. Y.
Reid, John & Co., 30 Church St., N. Y. C.

FURNACES (Boiler)
Contin. Iron Wks., West and Calyer Sts., Brooklyn.
Continental Boiler Works, The,
West and Calyer Sts., Brooklyn, N. Y.

GAGES
Air Reduction Sales Co., 120 Broadway, New York
American Injector Co., 176 14th St., Detroit.
American Steam Gauge & Valve Mfg. Co.,
Camden St., Boston, Mass.
Ashton Valve Co., 161 First St., Cambridge, Mass.
McNab Co., The, Bridgeport, Conn.
Penberthy Injector Co., Detroit, Mich.

GAGE COCKS
Jerguson Gage & Valve Co.,
Winter Hill, Somerville, Mass.

GAGE GLASSES
Jerguson Gage & Valve Co.,
Winter Hill, Somerville, Mass.

GALLEY EQUIPMENT
Bramhall, Deane Co.,
263 B. West 36th St., New York City.

GASKETS
Crane Co., The, 836 S. Michigan Ave., Chicago.
Dew Valve Co., Inc.,
149 Broadway, New York, N. Y.
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.

GAS (Electrolytic)
Gas Products Assn.,
801 Marquette Bldg., Chicago, Ill.

GAS PRODUCERS
Air Reduction Sales Co., 120 Broadway, New York

GEARS (Marine Reduction)
DeLaval Steam Turbine Co., Trenton, N. J.
Hunt, Mirk & Co., San Francisco, Cal.
Hunt, Mirk & Co., Seattle, Wash.
Kerr Turbine Co., Wellsville, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

GENERAL STEEL EQUIPMENT
Bernstein Mfg. Co., Philadelphia, Pa.

GENERATORS
American Blower Co., Detroit, Mich.
Enberg's Electric & Mechanical Works,
St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Livingston, J., & Co., Inc.,
Grand Central Terminal, New York City.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.
Williams, A. R., Machinery Co., Ltd.,
64-66 Front St., West, Toronto, Ont.

GENERATORS (Acetylene)
Air Reduction Sales Co., 120 Broadway, New York

GEAR BLANKS
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

GOVERNORS (Pump)
Mason Regulator Co., Boston, Mass.

GRATE BARS (Elliptic)
Thomas Grate Bar Co., Birmingham, Ala.

GRATINGS (For Floors, Walkaways, Etc.)
Irving Iron Works Co., Long Island City, N. Y.

GRAPHITE PAINT
Williams, Wm. E., New York, N. Y.

GREASE
Sun Company, Finance Bldg., Philadelphia, Pa.
Texas Company, 17 Battery Place, New York City.

GREASE CUPS
American Injector Co., 176 14th St., Detroit.
Lunkenheimer Co., The, Cincinnati, O.

GREASE (Launching)
Borne, Scrymser Co., 80 South St., N. Y. C.

GREASES (Shaft Alley)
Sun Company, Finance Bldg., Philadelphia, Pa.

GRINDERS (Electric)
Van Dorn Electric Tool Co., Cleveland, O.

GRINDERS (Pneumatic)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Indepen. Pneu. Tool Co., 600 Jackson Blvd., Chgo.

HAMMERS (Drop)
United Engineering & Foundry Co., Pittsburgh, Pa.

HAMMERS (Pneumatic)
Cleveland Pneumatic Tool Co., Cleveland, O.

HARDWARE (Marine)—See MARINE HARDWARE

HATCH COVERS
Smith, Arthur F., Co., Inc.,
261-267 Canal St., New York, N. Y.

HATCH FASTENERS
Mulholland Hatch-Fastener Co., Marion Bldg., Clevd.

HAWSE, BILGE AND BALLAST PIPE (Cast Iron)
Central Foundry Co., 90 West St., New York City.

HAWSERS (Manila)
Leshens, A., & Sons Rope Co., St. Louis, Mo.
Waterbury Co., 63 Park Row, New York, N. Y.
Whitlock Cordage Co., 46 Church St., N. Y. C.

HEATERS AND PURIFIERS (Feed Water)
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.
Schutte & Koerting Co., Philadelphia, Pa.

Digitized by Google

Anchors Stud Link Chain Forgings

Baldt Stockless Anchors
Old Style Anchors
Trotman Anchors
Fishing Type Anchors
Stud Link Chain
Shackles
Drop Forgings
Heavy Forgings

Baldt Anchor Company
Office & Works, Chester, Pa.

ELECTRIC WELDING

We go Right to the Job!

We are welding specialists. With our complete welding equipment on a motor truck, we are able to go any place that we are called.

Prompt Service ***Reasonable Prices***

We also specialize in
BOILER MAKING
in all its branches

PIONEER BOILER WORKS
Bruce M. Wright, Mgr.
Bard and Merchant Sts. **PORT HURON, MICH.**

Sydney C. McLouth
Marine City, Mich.

SHIPBUILDING
STEEL and WOOD

Plenty of water at dock for any boat. Repairs made to Hulls, Boilers or Machinery, nights, days or Sundays.

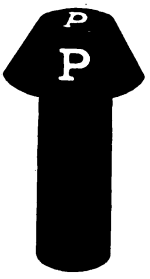
Thermit Welding for Marine Repairs

Broken stern frames, rudder frames, connecting rods, rudder stocks, crank shafts, tail shafts, and many other similar sections can be repaired very quickly and easily with Thermit.

Send for Pamphlet 3440

If you are in a hurry wire or telephone our nearest office.

Metal & Thermit Corporation
120 Broadway, New York City
7300 So. Chicago Ave., Chicago
329-333 Folsom St., San Francisco
1427 Western Ave., Pittsburgh
15 Emily St., Toronto, Ont.



RIVETS

"PERFECTION"
Boiler, Ship and Structural

Made from Carnegie Steel
Highest Grade Rivets Made

Diam. ½" to 1½". All Lengths

Write for Prices and Monthly Stock Lists

The Anthony Carlin Co., Cleveland

Malleable Iron Clinch Rings

Hot Galvanized or Self Colored

Straight or Countersunk Hole

Our method of galvanizing does not weaken the rings or make them brittle.

MALLEABLE IRON FITTINGS CO., Branford, Conn.

Digitized by Google

HEATING SYSTEMS
Schutte & Koerting Co., Philadelphia, Pa.

HOISTING ENGINES
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.

HOISTING MACHINERY
Chesapeake Iron Works, Baltimore, Md.

HOISTING AND TRANSMISSION ROPE (Manila)
Whitlock Cordage Co., New York, N. Y.

HOISTS (Air)
American Ship Building Co., Cleveland, O.
Boston & Lockport Block Co.,
124 Condor St., E. Boston, Mass.
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
General Electric Co., Schenectady, N. Y.
Great Lakes Engineering Works, Detroit, Mich.
McDougall-Duluth Co., Duluth, Minn
Shepard El. Crane & Hoist Co., Montour Falls, N. Y.
Whiting Foundry Equip. Co., The, Harvey, Ill.

HOISTS (Ash)
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.

HOISTS (Chain)
Chisholm-Moore Mfg. Co., The, Cleveland, Ohio.
Hobbs, Clinton E., Co., Boston, Mass.
Shepard El. Crane & Hoist Co., Montour Falls, N. Y.

HOISTS (Electric, Pneumatic, Hand)
Chicago Pneumatic Tool Co.,
1097 Fisher Bldg., Chicago.
The Chisholm-Moore Mfg. Co., Cleveland, Ohio.
Lidgerwood Mfg. Co., New York City.
Shepard Electric Crane & Hoist Co.,
Montour Falls, N. Y.
Superior Iron Works, Superior, Wis.
1097 Fisher Bldg., Chicago
Wellman-Seaver-Morgan Co., Cleveland, O.

HOOKS
Marine Hardware Equipment Co.,
South Portland, Maine.

HOSE
Diamond Rubber Co., Akron, O.
Electric Hose & Rubber Co., Wilmington, Del.
Goodrich, B. F., Co., Akron, O.
United States Rubber Co.,
1790 Broadway, New York

HOSE (Pneumatic)
Diamond Rubber Co., Akron, O.
Electric Hose & Rubber Co., Wilmington, Del.
Goodrich, B. F., Co., Akron, O.
Ingersoll-Rand Co., 11 Broadway, New York City.
Schrader's, A., Sons, Inc., Brooklyn, N. Y.
United States Rubber Co.,
1790 Broadway, New York
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.

HOSE (Steam)
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.

HYDROGEN
Air Reduction Sales Co., 120 Broadway, New York
Gas Products Assn., 801 Marquette Bldg., Chicago

ICE MACHINES
Brunswick Refrigerating Co.,
800-850 Jersey Ave., New Brunswick, N. J.
Kroeschell Bros. Ice Machine Co., Chicago.
Westinghouse Elec. & Mfg. Co., E. Pgh., Pa.

INDICATORS
American Steam Gauge & Valve Mfg. Co.,
Camden St., Boston, Mass.
Cory, Chas., & Son, 290 Hudson St., N. Y. C.
McNab Co., The, Bridgeport, Conn.
Walker, Thos., & Son, Ltd.,
58 Oxford St., Birmingham, Eng.

INJECTORS
American Injector Co., 176 14th St., Detroit.
Penberthy Injector Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.

INSULATORS
Electrose Mfg. Co., 60-82 Washington St., Brooklyn

INSURANCE (Marine)
Blodgett, O. W., Bay City, Mich.
Boland & Cornelius, 1204 Prudential Bldg., Buffalo
Hutchinson & Co., 1011 Leader-News Bldg., Clevd.
Quertier, D., Rouen, France.
Osborn Co., 175 W. Jackson Blvd., Chicago.
Richardson, W. C., & Co.,
816-818 Leader-News Bldg., Cleveland.
Vance & Joys, Milwaukee, Wis.

IRON AND STEEL
La Belle Iron Works, Steubenville, O.

IRON ORE
Hanna, M. A., & Co., Cleveland, O.
Pickands, Mather & Co., Cleveland, O.

JACKS (Ratchet Pulling)
Gracey, R., & Sons Co., Pittsburgh, Pa.

JUNCTION BOXES
Benjamin Electric Mfg. Co., Chicago, Ill.

KNIVES
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

KNIVES (Shear)
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

LADDER TREADS (Grating)
Irving Iron Works Co., Long Island City, N. Y.

LAMPS (Mazda and Arc)
General Electric Co., Schenectady, N. Y.

LATHE DOGS (Safety)
Williams, J. H., & Co., Brooklyn, N. Y.

LAUNCHES
Drein, Thomas, & Son, Wilmington, Del.

LAVATORIES
Crane Co., The, 836 S. Michigan Ave., Chicago.

LIFE BOATS, RAFTS, SUITS, PRESERVERS AND LIFE SAVING EQUIPMENT
American Balsa Co., Inc.
50 East 42nd St., New York City
Brauer, Justus, & Son, Inc., 129 Arch St., Phila.
Carpenter, Geo. B., & Co., 436 N. Wells St., Chgo.
Detroit Ship Bldg. Co., Detroit, Mich.
Drein, Thomas, & Son, Wilmington, Del.
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
Lane, C. M., Life Boat Co.,
250 Huron St., Brooklyn, N. Y.
National Life Preserver Co., 11 Broadway, N. Y. C.

LIFE PRESERVERS
Brauer, Justus, & Son, Inc., Philadelphia, Pa.
Lane, C. M., Life Boat Co.,
250 Huron St., Brooklyn, N. Y.
National Life Preserver Co., 11 Broadway, N. Y. C.

LIGHTING PLANTS
Williams, A. R., Machinery Co., Ltd.,
64-66 Front St., West, Toronto, Ont.

LIGHTS (Electric)
American Blower Co., Detroit, Mich.
Benjamin Electric Mfg. Co., Chicago, Ill.
Cory, Chas., & Son, 290 Hudson St., N. Y. C.
General Electric Co., Schenectady, N. Y.
Seidler-Miner Co., 36 Lafayette St., Detroit.

LINERS FOR CYLINDERS AND SHAFTS
Sandusky Fdry. & Machine Co., Sandusky, Ohio.

LOCKERS
Bernstein Mfg. Co., Philadelphia, Pa.

LOCOMOTIVE CRANES
U. S. Crane Co., 122 S. Michigan Ave., Chicago.

LUBRICANTS
Sun Company, Finance Bldg., Philadelphia, Pa.
Texas Company, 17 Battery Place, New York City.

LUBRICATORS
Lunkenheimer Co., The, Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.

LUMBER (Douglas Fir)
Sullivan Lbr. Co., Nw. Bk. Bldg., Portland, Ore.

LUMBER (Hewn Oak)
Taylor, S. K., Lumber Co., Mobile, Ala.

LUMBER (South Carolina Pine)
Southern Pine Assn., New Orleans, La.

LUMBER (Spars, Masts, Booms)
Western Spar Co., 910 Yeon Bldg., Portland, Ore.

MACHINERY (Coal Handling)
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.
Wellman-Seaver-Morgan Co., Cleveland, O.

MACHINERY (Conveying)
Lidgerwood Mfg. Co., New York City.

MACHINERY (Marine)
American Hoist & Derrick Co., St. Paul, Minn.
American Ship Building Co., Cleveland, O.
Baltimore Dry Dock & Shipbuilding Co.,
Locust Point, Baltimore, Md.
Chicago Ship Building Co., So. Chicago, Ill.
Collingwood Ship Building Co., Ltd.,
Collingwood, Ont., Can.
Fletcher, W. & A., Co., Hoboken, N. J.
Great Lakes Engineering Works, Detroit, Mich.
Hooven, Owens, Rentschler Co., Hamilton, O.
Kingsford Fdry. & Machine Co., Oswego, N. Y.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Superior Iron Works Co., Superior Wis.
Superior Ship Building Co., Superior, Wis.
Thomas Spacing Table Co., Pittsburgh, Pa.
Toledo Ship Building Co., Toledo, O.

MACHINERY (Pipe Bending)
American Pipe Bending Machine Co., Boston.
U. S. Shape & Pipe Bending Co.,
315 Howard St., San Francisco, Cal.

MACHINERY (Shipbuilders' Woodworking)
Crescent Machine Co., 27 Cherry St., Leetonia, O.
Power, L., Co., 3 So. 23rd St., Philadelphia.

MACHINERY (Wood Boring—Pneumatic)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chgo.
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co.,
600 Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Keller Pneumatic Tool Co., Grand Haven, Mich.

MACHINISTS
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
American Blower Co., Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
Marine Iron & Shipbuilding Co., Duluth, Minn.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Montreal Transportation Co., Ltd.,
Port Dalhousie, Ont., Can.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Ohio Ship Building Co., Beckman Bldg., Cleveland.
Sun Shipbuilding Co., Chester, Pa.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
United Engineering & Foundry Co., Pittsburgh, Pa.

MANIFOLDS (Ballast and Bilge)
Marine Equipment Co.,
Dept. of Kerr Machinery & Supply Co.,
Kerr Bldg., Detroit, Mich.

MARINE CABLEWAYS
Lidgerwood Mfg. Co., New York City.

MARINE CONNECTING AND ECCENTRIC RODS
Camden Forge Co, 8th and Bulson Ave, Camden, N.J.
Hooven, Owens, Rentschler Co., Hamilton, O.

MARINE DECKING—See DECKING (Marine)

MARINE FITTINGS
Benjamin Electric Mfg. Co., Chicago, Ill.
Seidler-Miner Co., 36 Lafayette St., Detroit.

MARINE HARDWARE
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
Marine Hardware Equipment Co.,
South Portland, Maine.

MARINE LIGHTING SETS
Enberg's Electric & Mechanical Works,
St. Joseph, Mich.
Western Electric Co., 195 Broadway, N. Y. C.

MARINE METALLIC PACKING
Holmes Metallic Packing Co.,
45 Westminster St., Wilkes Barre, Pa.

MARINE OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

MARINE OIL—See OIL (Marine)

MARINE RAILWAY BUILDERS
Crandall Engineering Co., 102 Border St., Boston.

MARINE SHAFT
Camden Forge Co. 8th and Bulson Ave, Camden, N. J.

MARINE SPECIALTIES
Kuhls, H. B. Fred,
65th St. and Third Ave., Brooklyn, N. Y.
Thacher Propeller & Foundry Corp., Albany, N. Y.

MARINE SUPPLIES
Carpenter, Geo. B., & Co., 436 N. Wells St., Chicago
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
Williams, Wm. E., New York, N. Y.

MARINE TELEPHONES
Western Electric Co., 195 Broadway, N. Y. C.

MASTS.
Western Spar Co., 910 Yeon Bldg., Portland, Ore.

MATTRESSES, PILLOWS AND CUSHIONS
Bernstein Mfg. Co.,
3rd St. and Allegheny Ave., Philadelphia.

MECHANICAL RUBBER GOODS
Mechanical Rubber Co., Cleveland, O.

METALLIC PACKING
Cook, C. Lee, Mfg. Co., Louisville, Ky.
Holmes Metallic Packing Co.,
45 Westminster St., Wilkes Barre, Pa.
France Packing Co., Tacony, Philadelphia, Pa.

MILDEWPROOFING (Canvas)
Robeson Preserve Co.,
401 White Block, Port Huron, Mich.

MOORING ENGINES
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.

MOORING FIXTURES
Central Foundry Co., 90 West St., New York City
Thacher Propeller & Foundry Corp., Albany, N. Y.

MOTORS (Electric)
General Electric Co., Schenectady, N. Y.
Livingston, J., & Co., Grand Central Term., N. Y. C.
Western Electric Co., 195 Broadway, N. Y. C.

MOTOR TRUCKS
Mutual Truck Company, Sullivan, Ind.

MOTORS (Winch)
General Electric Co., Schenectady, N. Y.

NAUTICAL INSTRUMENTS
Carpenter, Geo. B., & Co., 436 N. Wells St., Chicago.
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.
Ritchie, E. S., & Sons, Brookline, Mass.
Sperry Gyroscope Co., Brooklyn, N. Y.

NITROGEN
Air Reduction Sales Co., 120 Broadway, New York

NUTS (See Bolts and Nuts)

OAKUM
American Mfg. Co., Brooklyn, N. Y.
Carpenter, Geo. B., & Co., 436 N. Wells St., Chicago.
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
Stratford, Geo., Oakum Co.,
165 Cornelison Ave., Jersey City, N. J.

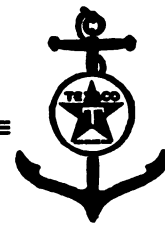
OIL BURNING EQUIPMENT
Schutte & Koerting Co., Philadelphia, Pa.

OIL CUPS
American Injector Co., 176 14th St., Detroit, Mich.
Lunkenheimer Co., The, Cincinnati, O.

OIL (Marine)
Borne, Scrymser Co., 80 South St., New York City.
Sun Company, Finance Bldg., Philadelphia, Pa.
Texas Company, 17 Battery Place, New York City.

OILS (Turbine)
Sun Company, Finance Bldg., Philadelphia, Pa.

Digitized by Google



TEXACO
Bunker Oils
Diesel Engine Fuel
Marine Lubricants

Adequate supplies and Prompt Delivery at the following Atlantic and Gulf Ports.

TEXACO FUEL OIL STATIONS

Providence, R. I.
New York, N. Y.
Philadelphia, Pa.
Baltimore, Md.
Norfolk, Va.

Charleston, S. C.
Savannah, Ga.
Jacksonville, Fla.
Key West, Fla.
Tampa, Fla.
Colon, C. Z.

New Orleans, La.
Gulfport, Miss.
Port Arthur, Tex.
Galveston, Tex.
Port Aransas, Tex.

TEXACO MARINE LUBRICATING OILS

Can be Secured at the following Ports

Rockland, Me.
Portland, Me.
Portsmouth, N. H.
Boston, Mass.
Providence, R. I.
New Bedford, Mass.
Newport, R. I.
New London, Conn.
New York, N. Y.
Philadelphia, Pa.

Baltimore, Md.
Newport News, Va.
Norfolk, Va.
Wilmington, Del.
Charleston, S. C.
Savannah, Ga.
Brunswick, Ga.
Jacksonville, Fla.
Key West, Fla.
Miami, Fla.
Colon, C. Z.

Tampa, Fla.
Pensacola, Fla.
Mobile, Ala.
New Orleans, La.
Gulfport, Miss.
Port Arthur, Tex.
Galveston, Tex.
Houston, Tex.
Port Aransas, Tex.
San Francisco, Cal.

Write for our Pamphlet on Texaco Bunker Oils

It contains a map showing the location of our fuel and lubricating oil stations along with other valuable data. It is yours for the asking.

The Texas Company

PETROLEUM and its PRODUCTS

17 Battery Place, New York City

New York Chicago Houston

Digitized by Google

OXY-ACETYLENE WELDING AND CUTTING—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

OXYGEN IN CYLINDERS
Air Reduction Sales Co., 120 Broadway, New York
Gas Products Assn., 801 Marquette Bldg., Chicago, Ill.
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Oxweld Acetylene Co., Newark, N. J.

PACKING
Carpenter, Geo. B., & Co., 436 N. Wells St, Chicago
Cook, Lee C., Mfg. Co., Louisville, Ky.
Crane Co., The, 836 S. Michigan Ave., Chicago
Dew Valve Company, Inc., 149 Broadway, New York, N. Y.
Diamond Rubber Co., Akron, O.
France Packing Co., Tacony, Philadelphia, Pa.
Goodall Rubber Co., Inc., Philadelphia, Pa.
Goodrich, B. F., Co., Akron, O.
Holmes Metallic Packing Co., 45 Westminster St., Wilkes Barre, Pa.
Mantell Packing Co., The, Elyria, O.
United States Rubber Co., 1790 Broadway, New York
U. S. Metallic Packing Co., The, Philidelphia.

PACKING (Black Sheet)
Voorhees Rubber Co., 20-56 Bostwick Ave., Jersey City, N. J.

PACKING (Jute)
Stratford, Geo., Oakum Co., Jersey City, N. J.

PACKING (Metallic)—See METALLIC PACKING

PACKING (Tarred Jute)
Stratford, Geo., Oakum Co., Jersey City, N. J.

PACKING (Untarred Jute)
Stratford, Geo., Oakum Co., Jersey City, N. J.

PAINT (Canvas)
Robeson Preservo Co., 401 White Block, Port Huron, Mich.

PAINT (Marine)
American Bitumastic Enamels Co., 17 Battery Place, New York City.
Kuhls, H. B. Fred, 65th St. and Third Ave., Brooklyn, N. Y.
Marine Decking & Supply Co., 1011 Chestnut St., Philadelphia, Pa.
Murphy Varnish Co., Newark, N. J.
Natroco Paint & Varnish Works, Tonawanda, N. Y.

PAINTING EQUIPMENT (Compressed Air and Portable)
DeVilbiss Mfg. Co., 1274 Dorr St., Toledo, O.

PAINT SPRAYING EQUIPMENT
DeVilbiss Mfg. Co., 1274 Dorr St., Toledo, O.

PANEL BOARDS AND CABINETS
Benjamin Electric Mfg. Co., Chicago, Ill.
Crouse-Hinds Co., Syracuse, N. Y.

PAPER, BLUE PRINTS
New York Blue Print & Paper Co., 102 Reade St., New York

PATENTS
Siggers & Siggers, Washington, D. C.

PELORUSES
Kelvin & Wilfred O. White Co., 112 State St., Boston, Mass.

PIG IRON
Hanna, M. A., & Co., Cleveland, O.
Pickands, Mather & Co., Cleveland, O.

PILE DRIVERS
Lidgerwood Mfg. Co., New York City.

PIPE BENDING MACHINERY—See MACHINERY (Pipe Bending)

PIPE COILS
Refrigeration Engineering Co., Toledo, Ohio.

PIPE FITTINGS (Steel, Iron and Brass)
Crane Co., The, 836 S. Michigan Ave., Chicago
Refrigeration Engineering Co., Toledo, Ohio.
United Engineering & Foundry Co., Pittsburgh, Pa.

PIPE (Iron and Steel)
Continental Iron Works, The, West and Calyer Sts., Brooklyn, N. Y.
Mark Mfg. Co., 1901 Dempster St., Evanston, Ill.

PIPE UNIONS
Mark Mfg. Co., 1901 Dempster St., Evanston, Ill.

PIPE WELDING
Metals & Thermit Corp., 120 Broadway, N. Y. C.

PLANING MILL MACHINERY (Beveling and Edging)
Power, L., Co., 3 So. 23rd St., Philadelphia.

PLASTER FIBRE
Stratford, Geo., Oakum Co., Jersey City, N. J.

PLATES (Tank, Boiler, Ship)
Lukens Steel Co., Coatesville, Pa.

PLUMBERS' OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

PLUMBING (Marine)
Crane Co., The, 836 S. Michigan Ave., Chicago

PLUNGERS
Camden Forge Co., 8th and Bolson, Camden, N. J.

PNEUMATIC TOOLS
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chicago.
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co., 600 Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Oldham, Geo., & Son Co., Frankford, Philadelphia.
Parish Sup. & Mfg. Co., 2848 Quinn St., Chicago

PNEUMERCATORS
Pneumercator Co., 15 Park Row, New York City.

POLISH (Metal and Wood)
Diamond Polish Co., Washington, Pa.

POP VALVES
American Steam Gauge & Valve Mfg. Co., Camden St., Boston, Mass.

PORT LIGHTS—see AIR PORTS

PORTABLES (Water Tight)
Benjamin Electric Mfg. Co., Chicago, Ill.

PRESSES (Hydraulic)
Mesta Machine Co., Homestead, Pa.

PRESSURE REGULATORS
Crane Co., The, 836 S. Michigan Ave., Chicago.
Mason Regulator Co., Boston, Mass.

PROJECTORS (Electric Flood Light)
Crouse-Hinds Co., Syracuse, N. Y.
General Electric Co., Schenectady, N. Y.

PROOFING (Canvas)
Robeson Preservo Co., 401 White Block, Port Huron, Mich.

PROPELLER BLADES
Cramp, Wm., & Sons Ship & Eng. Bldg. Co., Philadelphia, Pa.
Sheriffs Mfg. Co., Milwaukee, Wis.
Thacher Propeller & Fdry. Corp., Albany, N. Y.

PROPELLER HUBS
Cramp, Wm., & Sons Ship & Eng. Bldg. Co., Philadelphia, Pa.
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER SHAFTS
Heppenstall Forge & Knife Co., 47th and Hatfield Sts., Pittsburgh, Pa.

PROPELLER SHAFT SLEEVES
Sandusky Fdry. & Machine Co., Sandusky, Ohio.

PROPELLER WHEELS
American Ship Building Co., Cleveland, O.
Atlas Steel Casting Co., Buffalo, N. Y.
Baltimore Dry Dock & Shipbuilding Co., Locust Point, Baltimore, Md.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co., Philadelphia, Pa.
Detroit Ship Building Co., Detroit, Mich.
Great Lakes Engineering Works, Detroit, Mich.
Hooven, Owens, Rentschler Co., Hamilton, O.
Hyde Windlass Co., Water Street, Bath, Maine.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Sheriffs Mfg. Co., Milwaukee, Wis.
Superior Ship Bldg., Superior, Wis.
Thacher Propeller & Fdry. Corp., Albany, N. Y.
Toledo Ship Building Co., Toledo, O.
Trout, H. G., Co., King Iron Works, Buffalo, N. Y.

PROPELLERS
Cramp, Wm., & Sons, Ship & Eng. Bldg. Co., Philadelphia, Pa.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Hyde Windlass Co., Water Street, Bath, Maine.
Morse Dry Dock & Repair Co., Foot of 56th St., Brooklyn, N. Y.

PUMP CONNECTING RODS
Camden Forge Co. 8th and Bulson, Camden, N. J.

PUMP CRANK SHAFTS
Camden Forge Co., 8th and Bulson, Camden, N. J.

PUMPS
Boston & Lockport Block Co., E. Boston, Mass.
DeLaval Steam Turbine Co., Trenton, N. J.
Great Lakes Engineering Works, Detroit, Mich.
Howden, James, & Co., Ltd., Wellsville, N. Y.
Kerr Turbine Co., Wellsville, N. Y.
Kingsford Fdry. & Machine Works, Oswego, N. Y.
Morris Machine Works, Baldwinsville, N. Y.
National Transit, Pump & Machine Co., Oil City, Pa.
Roelker, H. B., New York, N. Y.
Traylor Engineering & Mfg. Co., Allentown, Pa.
Union Steam Pump Co., Battle Creek, Mich.
United Engineering & Foundry Co., Pittsburgh, Pa.
Westinghouse Electric & Mfg. Co., E. Pittsburgh,
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
Worthington Pump & Machinery Corp., 115 Broadway, New York City.

PUMPS (Boiler Feed)
National Transit, Pump & Mach. Co., Oil City, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Worthington Pump & Machinery Corp., 115 Broadway, New York City.

PUMPS (Circulating)
National Transit, Pump & Mach. Co., Oil City, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
Worthington Pump & Machinery Corp., 115 Broadway, New York City.

PUMPS (Diaphragm)
Boston & Lockport Block Co., 124 Condor St., E. Boston, Mass.

PUMPS (Steam)
Hughes-Limbach Co., The, Hippodrome Bldg., Cleveland, O.

PUMPS (Vacuum)
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.

PUNCHING MACHINERY (Steel Plate)
Thomas Spacing Machine Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Pittsburgh, Pa.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

PYROMETERS
Locomotive Superheater Co., 30 Church St., N. Y. C.

RAFTS
Detroit Shipbuilding Co., Detroit, Mich.
Drein, Thomas, & Son, Wilmington, Del.
Lane, C. M., Life Boat Co., 250 Huron St., Brooklyn, N. Y.

RANGES (Cooking)
Bramhall, Deane Co., 263 E. West 36th St., New York City.

REAMERS
Parish Supply & Mfg. Co., 2848 Quinn St., Chicago, Ill.

REAMERS (Electric)
Van Dorn Electric Tool Co., Cleveland, O.

RECEPTACLES (Electrical)
Benjamin Electric Mfg. Co., Chicago, Ill.

REFRIGERATING MACHINERY
Brunswick Refrigerating Co., 800-850 Jersey Ave., New Brunswick, N. J.
Great Lakes Engineering Works, Detroit, Mich.
Kroeschell Bros. Ice Machine Co., Chicago.
Refrigeration Engineering Co., Toledo, Ohio.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

REGISTERING INSTRUMENTS (Draft)
Pneumercator Co., 15 Park Row, New York City.

RELEASING HOOK—See HOOKS (Releasing)

REPAIRS (Marine)
Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.
American Ship Building Co., Cleveland, O.
Baltimore Dry Dock & Shipbuilding Co., Locust Point, Baltimore, Md.
Bath Iron Works, Bath, Me.
Buffalo Dry Dock Co., Buffalo, N. Y.
Chicago Ship Building Co., So. Chicago, Ill.
Collingwood Ship Bldg. Co., Ltd., Collingwood Ont., Can.
Commercial Boiler Works, The, Seattle, Wash.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co., Philadelphia, Pa.
Detroit Ship Building Co., Detroit, Mich.
Fletcher, W. & A., Co., Hoboken, N. J.
Fore River Ship Bldg., Corp., Quincy, Mass.
Foundation Co., The, Port Huron Shipyard, Inc., Port Huron, Mich.
Great Lakes Engineering Works, Detroit, Mich.
Manitowoc Ship Bldg. Co., Manitowoc, Wis.
Marine Iron & Shipbuilding Co., Duluth, Minn.
McLouth, Sydney C., Marine City, Mich.
Metals & Thermit Corp., 120 Broadway, N. Y. C.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Montreal Transportation Co., Ltd., Port Dalhousie, Ont., Can.
Moore & Scott Iron Works, San Francisco.
Morse Dry Dock & Repair Co., Foot of 56th St., Brooklyn, N. Y.
Northwest Engineering Works, Green Bay, Wis.
Ohio Ship Building Co., Beckman Bldg., Cleveland.
Pioneer Boiler Works, Bard and Merchant Sts., Port Huron, Mich.
St. Lawrence Marine Ry. Co., Ogdensburg, N. Y.
Sun Shipbuilding Co., Chester, Pa.
Superior Ship Bldg. Co., Superior, Wis.
Todd Shipyards Corp., 15 Whitehall St., New York City.
Toledo Ship Bldg. Co., Toledo, O.

RIGGING
Baltimore Dry Dock & Shipbuilding Co., Locust Point, Baltimore, Md.

RIVET CUTTING GUN
Dew Valve Company, Inc., 149 Broadway, New York, N. Y.

RIVETS
American Flexible Bolt Co., 50 Church St., New York, N. Y.
Carlin, The, Anthony, Co., Cleveland, O.
Champion Rivet Co., Harvard and E. 108th St., Cleveland, O.
Oliver Iron & Steel Co., 10th and Muriel Sts., Pittsburgh, Pa.
Severance, S., Mfg. Co., Glassport, Pa.

RIVETS (Boiler)—See BOILER RIVETS

RIVETS (Ship)
American Flexible Bolt Co., 50 Church St., New York, N. Y.
Great Lakes Engineering Works, Detroit, Mich.
Severance, S., Mfg. Co., Glassport, Pa.

RIVETS (Structural)
Severance, S., Mfg. Co., Glassport, Pa.

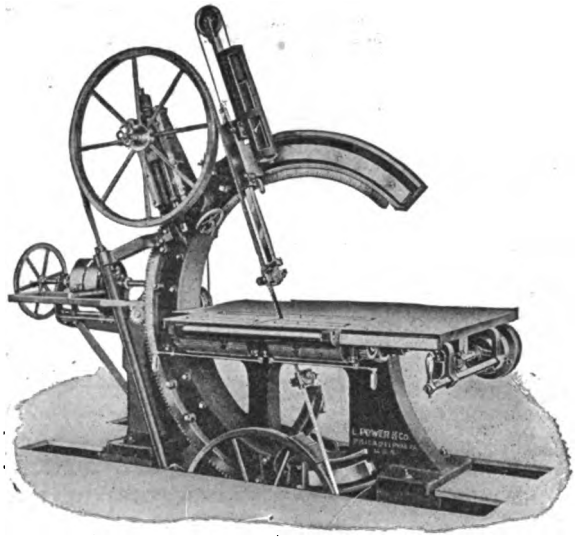
RIVETS (Tanks)
Severance, S. Mfg. Co., Glassport, Pa.

RIVETING HAMMERS (Pneumatic)
Chicago Pneu. Tool Co., 1097 Fisher Bldg., Chicago
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co., 600 Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Oldham, Geo., & Son, Co., Frankford, Philadelphia.

Digitized by Google

Number Eleven Adjustable Bevel Band Saw

For Ship and Boat Yards



The Original and Standard Machine for wooden boat building for sixteen years.
Angles to 45 degrees each side of centre.
Power and hand movement to sliding wheel frame.
Power driven feed rolls in table to the front and back of saw instantly raised or lowered.
Automatic tighteners to belts.

L. POWER & COMPANY
3 South 23rd Street, Philadelphia, Pa.
All the Machines for Building Wooden Boats

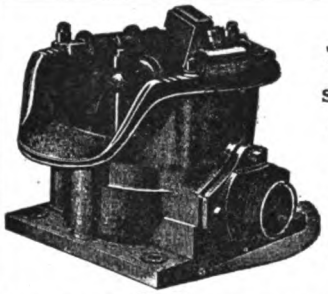
Crescent Angle Band Saws

Are built in two sizes, especially for Ship Yard use

The angle may be changed while the machine is in motion as the tilting operation automatically takes care of all adjustments. There is no belt length to adjust, and guides and table keep their proper positions. The machine is simple in operation and is of rigid construction.

Ask today for catalog giving complete description and telling about our line of band saws, saw tables, jointers, shapers, variety wood workers, planers, planers and matchers, cut off tables, swing saws, disk grinders, borers, hollow chisel mortiser, Universal wood workers.

The Crescent Machine Co.
35 Cherry St. Leetonia, Ohio, U. S. A.



Manufacturers of
★ STAR BRAND BLOCKS ★
Special Blocks of all styles for all kinds of heavy work
STRONGEST BLOCKS MADE

Blocks and Pumps

No. 181L
PUMPS FOR MARINE CONTRACTORS, Sewer Departments, Water Works and Railroads.
BOSTON & LOCKPORT BLOCK CO.
124 Condor Street EAST BOSTON, MASS.
NEW YORK CITY 33 South Street — CHICAGO 413 Fort Dearborn Bldg. — SAN FRANCISCO 110 Market Street

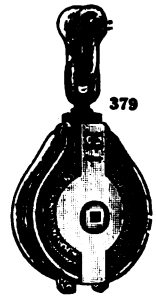
W. H. McMillan's Sons

Makers of

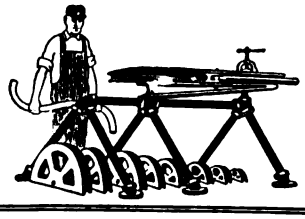
Tackle Blocks

For

Shipbuilders and Marine Work



153 South St., New York 32-44 Penn St., Brooklyn, N. Y.



POWER BENDERS THREE NEW MODELS
"Wonder" Pipe Bending Machines (pat.) electrically operated to bend from 1" to 20". Send for printed matter. We also manufacture TEN other sizes, hand operated to bend from ⅛" to 8".
American Pipe Bending Machine Co.
95 Pearl St., BOSTON, MASS., U. S. A.

THE CHASE MACHINE CO.

ENGINEERS AND MACHINISTS
Mooring Machines, Deck Winches, Steam Capstans, Etc., Etc.
Address 2313 Elm St., N. W. Cleveland, Ohio

J. R. BRAGA, Hong-Kong, China

Telegraphic address, "Braga." Office, 64 Connaught Road Central.
Broker for Charter and Loading of steamers in the Orient, and Freight Agent. Regular service of steamers to Ports in South China and French Indo-China. Correspondence solicited and information offered to all American shipping firms seeking connection in the Far East. Shipping prospects and local conditions of each Oriental Country furnished.
Ships taken charge of, discharged and loaded with the quickest despatch in all Oriental Pacific Ports at most moderate commission.
Financial Guarantee offered to every business thru first class Bankers.
Correspondents in all Ports in China, French Indo-China, Philippines, Siam, Java, Borneo, Straits Settlements, India and Ceylon.

SALVAGE PROPOSITIONS DESIRED
100 to 500 ft. DEPTH
The LEAVITT DIVING ARMOR holds all WORLD RECORDS For Diving 361 ft.
Time of Submergence 4 Hours.
Salvage of Steamer PEWABIC in 176 ft. of water.
Inquiries Solicited.
LEAVITT DEEP SEA SALVAGE CO., INC.
Temple Bar Annex Brooklyn, New York

Digitized by Google

RIVET SETS (Pneumatic)
Cleveland Pneumatic Tool Co., Cleveland, O.
Oldham, Geo., & Son, Co., Frankford, Philadelphia.
Parish Sup. & Mfg. Co., 2848 Quinn St., Chicago

RODS (Connecting)
Camden Forge Co., 8th and Bulson, Camden, N. J.
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

RODS (Piston)
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

ROLLS (Bending and Straightening)
Camden Forge Co., 8th and Bulson, Camden, N. J.
United Engineering & Foundry Co., Pittsburgh, Pa.

ROPE (Manila Net)
Whitlock Cordage Co., 46 Church St., N. Y. C.

ROPE (Manila, Sisal and Other Hard Fiber Cordage)
American Mfg. Co., Brooklyn, N. Y.
Waterbury Co., 63 Park Row, New York, N. Y.
Whitlock Cordage Co., 46 Church St., N. Y. C.

ROPE (Transmission)
American Mfg. Co., Brooklyn, N. Y.
Waterbury Co., 63 Park Row, New York, N. Y.
Whitlock Cordage Co., 46 Church St, New York City

ROPE (Wire)
Waterbury Co., 63 Park Row, New York, N. Y.

ROPE AND TWINE
Turner, Halsey Co.,
62 Leonard St., New York City.

ROPE DRIVES AND TRAMWAYS
Waterbury Co., 63 Park Row, New York, N. Y.
Whitlock Cordage Co., 46 Church St, New York City

ROPE OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

ROTARY BALL-BEARING VENTILATORS
Ohio Blower Co., Cleveland, O.

RUDDER STOCK
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.

SAFETY SUITS (Life Preserving)
National Life Preserver Co., 11 Broadway, N. Y. C.

SAIL DUCK
Mt. Vernon-Woodberry Mills, Inc., Baltimore, Md.

SAND RAMMERS
Cleveland Pneumatic Tool Co., Cleveland, O.

SAWS
United Engineering & Foundry Co., Pittsburgh, Pa.

SCHOONERS (Auxiliary)
American Ship Building Co., Cleveland, O.
Baltimore Dry Dock & Shipbuilding Co.,
Locust Point, Baltimore, Md.
Buffalo Dry Dock Co., Buffalo, N. Y.
Chicago Ship Building Co., So. Chicago, Ill.
Collingwood Ship Building Co., Ltd.,
Collingwood, Ont., Can.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Tietjen and Lang Dry Dock Co., Hoboken, N. J.
Toledo Ship Building Co., Toledo, O.

SCOW WINDING MACHINERY
Superior Iron Works Co., Superior, Wis.

SCREWS
Milton Mfg. Co., Milton, Pa.

SCREW PROPELLERS
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Thacher Propeller & Fdry. Corp., Albany, N. Y.

SEARCHLIGHTS
Sperry Gyroscope Co., Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
Crouse-Hinds Co., Syracuse, N. Y.
General Electric Co., Schenectady, N. Y.

SECOND HAND MACHINERY (See Machinery, Second Hand)

SEMAPHORES
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.

SEPARATORS (Steam, Oil and Water)
Anderson, The V. D., Co., Cleveland O.
Crane Co., The 836 S. Michigan Ave., Chicago.
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.
Ohio Blower Co., Cleveland, O.
Wright-Austin Co., Detroit, Mich.

SEXTANTS
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.

SHACKLES
Marine Hardware Equipment Co.,
South Portland, Maine.

SHAFTING
Camden Forge Co., 8th and Bulson, Camden, N. J.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.

SHAFTING (Forged Steel)
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

SHAFT SLEEVES
Sandusky Fdry. & Machine Co., Sandusky, Ohio.

SHAPES (Iron and Steel)
Chesapeake Iron Works, Baltimore, Md.

SHEARS (Power)
United Engineering & Foundry Co., Pittsburgh, Pa.

SHEARS (Rotary)
Quickwork Company, St. Mary's, Ohio.

SHEATHING FELT
Stratford, Geo., Oakum Co.,
165 Cornelison Ave., Jersey City, N. J.

SHECKLES
Baldt Anchor Company,
6th and Butler Sts., Chester, Pa.

SHEET IRON WORK
Commercial Boiler Works, The, Seattle, Wash.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.

SHIPBUILDERS
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
American Ship Building Co., Cleveland, O.
Baltimore Dry Dock & Shipbuilding Co.,
Locust Point, Baltimore, Md.
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Buffalo Dry Dock Co., Buffalo, N. Y.
Burger Bros. Boat Co., Manitowoc, Wis.
Chicago Ship Building Co., So. Chicago, Ill.
Collingwood Ship Building Co., Ltd.,
Collingwood, Ont., Can.
Consolidated Shipbuilding Corp., New York City.
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
Davis, M. M., & Son,
366 Fifth Ave., New York City.
Detroit Ship Building Co., Detroit, Mich.
Fletcher, W. & A., Co., Hoboken, N. J.
Foundation Co., The, Port Huron Shipyard, Inc.,
Port Huron, Mich.
Fraser, Brace Shipyards, Ltd.,
1300 St. Patrick St., Montreal, Canada.
Great Lakes Engineering Works, Detroit, Mich.
Manitowoc Ship Building Co., Manitowoc, Wis.
Marine Iron & Shipbuilding Co., Duluth, Minn.
McDougall-Duluth Co., Duluth, Minn.
McLouth, Sydney Co., Marine City, Mich.
Merchant Shipbuilding Corp., 165 Broadway, N. Y.
Milwaukee Dry Dock Co., Milwaukee, Wis.
Ohio Ship Building Co.,
Beckman Bldg., Cleveland, O.
Sun Shipbuilding Co., Chester, Pa.
Superior Ship Building Co., Superior, Wis.
Todd Shipyards Corp.,
15 Whitehall St., New York City.
Toledo Ship Building Co., Toledo, O.
Whitney Brothers Co., Superior, Wis.

SHIPBUILDERS WOODWORKING MACHINERY (See Machinery) (Shipbuilders' Woodworking).

SHIPBUILDING LUMBER AND TIMBERS
Southern Pine Assn., New Orleans, La.
Sullivan Lbr Co Nw. Bk. Bldg., Portland, Ore.

SHIPBUILDING SYSTEM
Isherwood, J. W., 17 Battery Place, New York City

SHIP COWLS
Ohio Blower Co., Cleveland, O.

SHIP GRATINGS
Irving Iron Works Co., Long Island City, N. Y.

SHIP LOGS
Walker, Thos., & Son, Ltd.,
58 Oxford St., Birmingham, Eng.

SHIP PLATES
Youngstown Sheet & Tube Co., Youngstown, O.

SHIP RIVETS—See Rivets (Ship).

SHIP STABILIZERS
Sperry Gyroscope Co., Brooklyn, N. Y.

SHIP SURVEYORS—See Surveyors (Ship)

SHIPPING AGENTS
Quertier, D., Rouen, France.
Van Kricken, H. & Co., Rotterdam, Holland.

SHIPYARD EQUIPMENT
Thomas Spacing Machine Co., Pittsburgh, Pa.

SIGNALING APPARATUS
Benjamin Electric Mfg. Co., Chicago, Ill.

SOCKETS (Electrical)
Bryant Electric Co., Bridgeport, Conn.

SOLDERING FLUX
Allen, L. B., Company,
4529 N. Lincoln St., Chicago, Ill.

SOUNDING MACHINES
Kelvin & Wilfred O. White Co.,
112 State St., Boston, Mass.

SPACING TABLES
Thomas Spacing Table Co., Pittsburgh, Pa.

SPARS (Rough or Finished)
Southern Pine Assn., New Orleans, La.
Sullivan Lbr Co., Nw Bk Bldg., Portland, Ore.
Western Spar Co., 910 Yeon Bldg., Portland, Ore.

SPECIALTIES (Steam)
Anderson, The V. D., Co., Cleveland, O.
Crane Co., The, 836 S. Michigan Ave., Chicago.
Lunkenheimer Co. The, Cincinnati, O.

SPRAYING EQUIPMENT (Paint) (See Paint Spraying Equipment)

SPUD POINTS
Morris Machine Works, Baldwinsville, N. Y.

SPUN OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

STAIRS (Iron)
Irving Iron Works Co., Long Island City, N. Y.

STAIR TREADS (Grating)
Irving Iron Works Co., Long Island City, N. Y.

STAYBOLTS (Boiler, Iron or Steel, Hollow or Solid)
American Flexible Bolt Co.,
50 Church St., New York.
Falls Hollow Staybolt Co., Cuyahoga Falls, O.

STAYBOLT DRIVERS (Pneumatic)
Independent Pneumatic Tool Co.,
600 Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.

STEAM ENGINES
Enberg's Electric & Mechanical Works,
St. Joseph, Mich.

STEAM ENGINE FORGINGS
Camden Forge Co.,
8th and Bulson Ave., Camden, N. J.

STEAM SPECIALTIES
Reid, John & Co., 30 Church St., N. Y. C.

STEAMERS (River)
Ward, Chas., Engrg. Works, Charleston, W. Va.

STEAMSHIP LINES (Passenger and Freight, European)
American Line, 9 Broadway, New York city.

STEARINE (Launching)
Borne, Scrymser Co.,
80 South St., New York City.

STEEL (Die)
Heppenstall Forge & Knife Co.,
47th and Hatfield Sts., Pittsburgh, Pa.

STEEL (Open Hearth)
Atlas Steel Casting Co., Buffalo, N. Y.

STEEL EQUIPMENT (General)
Bernstein Mfg. Co.,
3rd St. and Allegheny Ave., Philadelphia.

STEEL PLATE WORK
Bridgeport Boiler Works, The,
Housatonic St., Bridgeport, Conn.

STEEL SHIPS
Alabama Dry Dock & Shipbuilding Co.,
Mobile, Ala.
Saginaw Shipbuilding Co., Saginaw, Mich.

STEEL TANKS
Kroeschell Bros. Ice Machine Co., Chicago, Ill.

STEERING ENGINES
American Engineering Company, Philadelphia, Pa.
Hyde Windlass Co., Water Street, Bath, Maine.
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.

STEERING GEARS
American Engineering Co., Philadelphia, Pa.
American Ship Building Co., Cleveland, O.
Dake Engine Co., Grand Haven, Mich.
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.

STEERING WHEELS
American Engineering Company, Philadelphia, Pa.

STERILIZING APPARATUS (Water)
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.
Schutte & Koerting Co.,
12th and Thompson St., Philadelphia.

STERN FRAMES
Mesta Machine Co., Homestead, Pa.

STERN TUBES
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Mesta Machine Co., Homestead, Pa.

STOKERS
American Engineering Co., Philadelphia, Pa.
Babcock & Wilcox Co., New York, N. Y.

STOVES (Cooking)
Bramhall, Deane Co.,
263 B. West 36th St., New York City.

STRAINERS
Wright-Austin Co., Detroit, Mich.

STRUCTURAL RIVETS—See Rivets (Structural)

SUPERHEATERS (Marine)
Babcock & Wilcox Co., New York, N. Y.
Badenhausen Co.,
1425 Chestnut St., Philadelphia, Pa.
Heine Safety Boiler Co.,
5325 Marcus Ave., St. Louis, Mo.
Locomotive Superheater Co, 30 Church St., N. Y. C.
Power Specialty Co., 111 Broadway, N. Y. C.

SUPERHEATERS (Stationary)
Heine Safety Boiler Co.,
5325 Marcus Ave., St. Louis, Mo.

SURFACE CONDENSERS
Hughes-Limbach Co., The,
Hippodrome Bldg., Cleveland, O.

SURVEYING INSTRUMENTS
New York Blue Print & Paper Co.,
102 Reade St., New York

SURVEYORS (Ship)
American Bureau of Shipping, New York City.

SWITCHBOARDS
General Electric Co., Schenectady, N. Y.

SWITCHES (Electrical)
Benjamin Electric Mfg. Co., Chicago, Ill.
Bryant Electric Co., Bridgeport, Conn.
Crouse-Hinds Co., Syracuse, N. Y.

SWITCHES FOR MONORAIL SYSTEMS
Chisholm-Moore Mfg. Co., The, Cleveland, Ohio.

TANK RIVETS—See Rivets (Tank)

TANKS
Bridgeport Boiler Works, The,
Housatonic St., Bridgeport, Conn.

Digitized by Google

ESTABLISHED, 1854.

SHERIFFS MANUFACTURING CO.

PROPELLER WHEELS and PROPELLER BLADES to fit any hub.

MILWAUKEE, WIS.

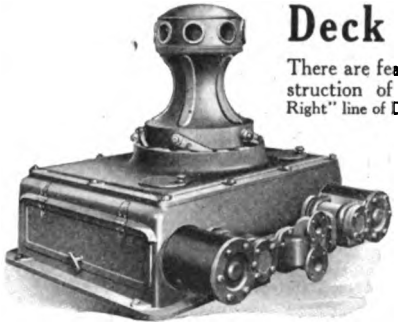
HYTEMPITE

High Temperature Cement

For bonding and repairing fire clay or silica brick work, tile, retorts, crucibles, etc.

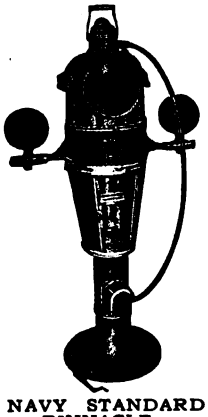
Quigley Furnace Specialties Co. Inc.
26 Cortlandt Street New York

"Built Right Run Right"
Deck Machinery



There are features in design and construction of the "Built Right Run Right" line of Deck Machinery which will recommend these machines to you. There were never better Winches, Windlasses, Steering Engines and Capstans built than we are offering. Uncle Sam has used thousands of them and other users pronounce them "The best Ever." Let us send you printed matter. Facilities that are unsurpassed make quick deliveries possible.

THE AMERICAN CLAY MACHINERY CO., Bucyrus, Ohio
Philadelphia Office, 516 Liberty Bldg.



NAVY STANDARD BINNACLE

RITCHIE
Compasses, Binnacles,
and NAUTICAL Instruments

SOLD IN ALL PARTS OF THE WORLD

Magnets for Adjusting Purposes.

E. S. RITCHIE & SONS
BROOKLINE - MASS.

NATROCO PAINT & VARNISH WORKS
Fillmore Ave. - - TONAWANDA, N. Y.

Makers of Marine Paints

A phone call from Buffalo (Bell North 4034) will secure prompt delivery via our motor trucks to dock or supply boat.

ANDREW J. MORSE & SON, Inc.
221 High Street BOSTON, MASS.
Established 1837

Diving Apparatus and Submarine Armor
Fire Department Supplies
The Morse Monitor Nozzle
Callahan Shut-Off Nozzle

LIFE PRESERVERS
Cork Cushions, Fenders, Cork Ring Buoys
"Ye Oldest Cork House in America"
ESTABLISHED 1865
JUSTUS BRAUER & SON
129 Arch Street Incorporated Philadelphia, Pa.

U. S. CRANE CO.
PEOPLES GAS BLDG., CHICAGO
LOCOMOTIVE CRANES
STRONGEST—MOST ACCESSIBLE
FOR PROOF: SEE OUR CRANE
GET OUR SPECIFICATIONS.

OPPORTUNITIES FOR EVERYBODY

are being constantly presented through the "Classified Columns" of THE MARINE REVIEW.

Bargains in Boats
General Operating Equipment
Ship Building and Fit-Out Materials
Investments—Opportunities

are of interest to you and every other reader of this paper. It will pay you to refer to the "Classified" Section Monthly. Turn NOW to pages 174-175 and see what you can buy or sell to advantage.

"Get the Habit—it Pays Dividends"

412

THE MULHOLLAND HATCH-FASTENER COMPANY
Main 272 Marion Building, Cleveland, Ohio Cent. 1016

Manufacturers of the Mulholland Simplex and Security Hatch Fasteners. For Ocean and Lake Trade.

OVER 225,000 SETS NOW IN USE ON THE GREAT LAKES

Alabama Hewn Oak Timber

Trade T Mark
Reg. U. S. A.

THE S. K. TAYLOR LUMBER COMPANY
Mobile, Alabama

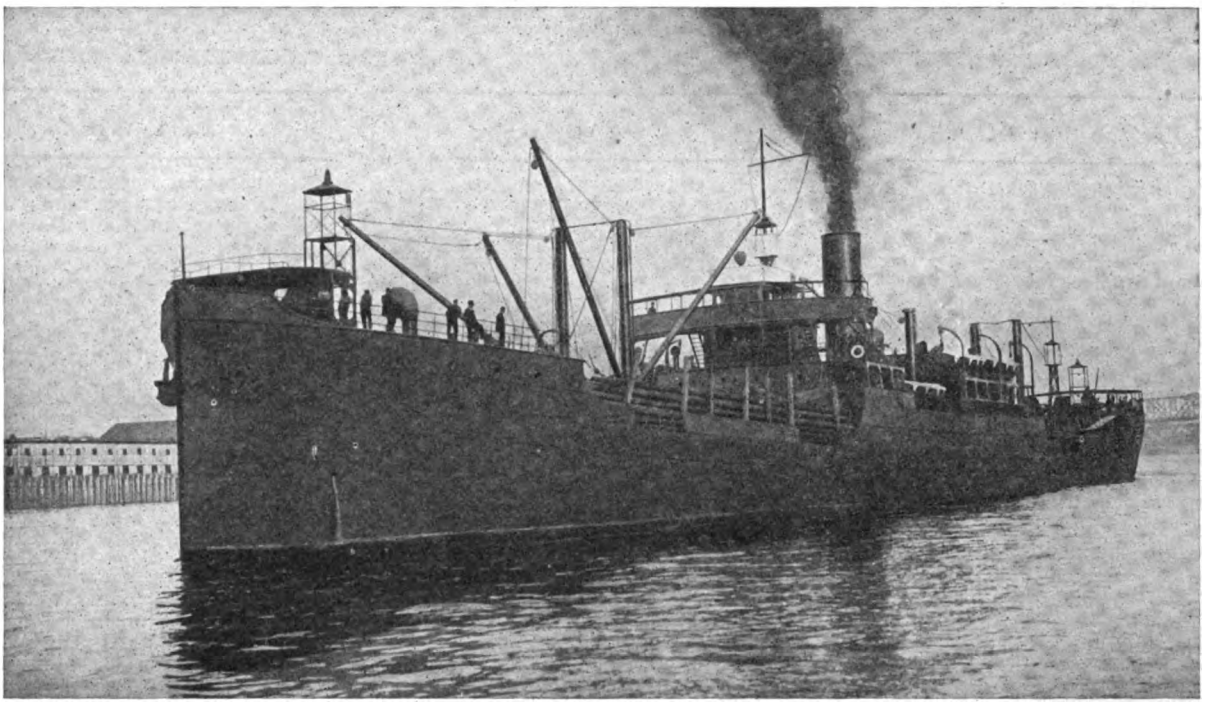
TANKS (Acetylene)
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Prest-O-Lite Co., Inc., 30 E. 42nd St., N. Y. C.
TANKS (Riveted)
Bath Iron Works, Bath, Me.
Lake Erie Boiler Works, Buffalo, N. Y.
TANKS (Welded Steel)
Continental Iron Works, The,
West and Calyer Sts., Brooklyn, N. Y.
TAPERED LINERS
Irving Iron Works Co., New York, N. Y.
TARRED ROPE OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.
TELEGRAPH (Mechanical and Electrical)
Cory, Chas., & Son, 290 Hudson St., New York City
TELEMOTORS (Electric)
American Engineering Company, Philadelphia, Pa.
Benson Electric Co., Superior, Wis.
TELEPHONES AND TELEGRAPHS (Ship)
Cory, Chas. & Son, 290 Hudson St., New York City
THERMIT
Metals & Thermit Corp., 120 Broadway, N. Y. C.
THIMBLES
Marine Hardware Equipment Co.,
South Portland, Maine.
THRUST BEARINGS
Albert Kingsbury, 532 Oliver Bldg., Pittsburgh, Pa.
TIMBERS (For Planking, Keelson, Decking)
Southern Pine Assn., New Orleans, La.
Sullivan Lbr. Co., Nw. Bk. Bldg., Portland, Ore.
TOOL HOLDERS
Williams, J. H., & Co., Brooklyn, N. Y.
TORCHES, BURNERS AND BRAZING OUTFITS (Acetylene, Blow, Oxy-Acetylene)
Air Reduction Sales Co., 120 Broadway, N. Y. C.
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Oxweld Acetylene Co., Newark, N. J.
Penberthy Injector Co., Detroit, Mich.
TORCHES (Welding and Cutting)
Air Reduction Sales Co., 120 Broadway, New York
TOWING CABLES
Lesbens, A., & Sons Rope Co., St. Louis, Mo.
TOWING LINES (Manila)
Waterbury Co., 63 Park Row, New York City
Whitlock Cordage Co., 46 Church St., New York City
TOWING LINES (Wire)
Hobbs, Clinton E., Co., Boston, Mass.
Waterbury Co., 63 Park Row, New York City
TOWING MACHINES
American Engrg. Co., Philadelphia, Pa.
Lidgerwood Mfg. Co., New York City.
TRACING CLOTH
New York Blue Print & Paper Co.,
102 Reade St., New York
TRAMWAYS (Aerial, Wire Rope)
Waterbury Co., 63 Park Row, New York City
TRANSMISSION (Rope) See ROPE (Transmission)
TRAPS (Steam, Air, Vacuum)
American Blower Co., Detroit, Mich.
Anderson, The V. D., Co., Cleveland, O.
Crane Company, The, 836 S. Michigan Ave., Chicago
Hughes-Limbach Co., The,
Hippodrome Bldg., Cleveland, O.
Ohio Blower Co., Cleveland, O.
Wright-Austin Co., Detroit, Mich.
TRAWLERS (Steel and Wood)
Northwest Engineering Works, Green Bay, Wis.
TREADS (Stairs and Ladders)
Irving Iron Works Co., Long Island City, N. Y.
TREENAILS
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
TROLLEYS
The Chisholm-Moore Mfg. Co., Cleveland, Ohio.
Shepard Electric Crane & Hoist Co.,
Montour Falls, N. Y.
Whiting Foundry Equipment Co., Harvey, Ill.
TUBES (Boiler)—See BOILER TUBES
TUBES (Plain and Stay)
Tyler Tube & Pipe Co., The, Washington, Pa.
TUBING (Cold Drawn Seamless Steel)
Detroit Seamless Steel Tube Co., Detroit, Mich.
TUGS
Burger Bros. Boat Co., Manitowoc, Wis.
TUGS (Steel and Wood)
Northwest Engineering Works, Green Bay, Wis.
TURBINE SHAFTS
Camden Forge Co., 8th and Bulson, Camden, N. J.
TURBINES
Falk Co., The, Foot of E. 30th St., Milwaukee.
Kerr Turbine Co., Wellsville, N. Y.
Sun Company, Finance Bldg., Philadelphia, Pa.
TURBINES (Electrical)
General Electric Co., Schenectady, N. Y.
TURBINES (Steam)
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Delaval Steam Turbine Co., Trenton, N. J.
Kerr Turbine Co., Wellsville, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
TURBO GENERATORS
Kerr Turbine Co., Wellsville, N. Y.
TURNBUCKLES
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
Larkin, J. K., & Co., New York City
Marine Hardware Equipment Co.,
South Portland, Maine.
UNIONS
Crane Company, The, 836 S. Michigan Ave., Chicago
Mark Mfg. Co., 1901 Dempster St., Evanston, Ill.
UNTARRED ROPE OAKUM
Stratford, Geo., Oakum Co., Jersey City, N. J.

VALVES
Jerguson Gage & Valve Co.,
Winter Hill, Somerville, Mass.
VALVES AND FITTINGS
Ashton Valve Co., 161 First St., Cambridge, Mass.
Auld Co., The, Philadelphia, Pa.
Crane Company, The, 836 S. Michigan Ave., Chicago
Dew Valve Company, Inc.,
149 Broadway, New York, N. Y.
Lunkenheimer Co., The, Cincinnati, O.
Marine Equipment Co., Dept. of Kerr Machinery & Supply Co., Kerr Bldg., Detroit, Mich.
Penberthy Injector Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Scully Steel & Iron Co., Chicago, Ill.
VALVE BODIES
Camden Forge Co., 8th and Bulson, Camden, N. J.
VALVES (Atmospheric Exhaust)
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
VALVES (Balance and Float)
Mason Regulator Co., Boston, Mass.
VALVES (Blow Off)
Dew Valve Company, Inc.,
149 Broadway, New York, N. Y.
VALVES (Condenser, Pump, Rubber)
Dew Valve Company, Inc.,
149 Broadway, New York, N. Y.
Diamond Rubber Co., Akron, O.
Goodrich, B. F., Co., Akron, O.
United States Rubber Co.,
1790 Broadway, New York
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.
VALVES (Drain)
Dew Valve Company, Inc.,
149 Broadway, New York, N. Y.
VALVES (Gate Exhaust)
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
VALVES (Reducing)
Mason Regulator Co., Boston, Mass.
VALVES (Steam Whistle-Balanced)
Benson Electric Co., Superior, Wis.
VARNISH (Marine)
Murphy Varnish Co., Newark, N. J.
VENTILATING SYSTEMS
American Blower Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
VESSEL AGENTS
Vance & Joys Co.,
1004-1006 First Nat'l. Bk. Bldg., Milwaukee
VESSEL AND INSURANCE AGENTS
Boland & Cornelius,
1204 Prudential Bldg., Buffalo, N. Y.
Braga, J. R., Hongkong, China.
Hutchinson & Co.,
1011 Leader-News Bldg., Cleveland
Richardson, W. C., & Co.,
816-818 Leader-News Bldg., Cleveland
Vance & Joys Co.,
1004-1006 First Nat'l. Bk. Bldg., Milwaukee
VESSEL BROKERS
Chicago Steamboat Exchange, Chicago, Ill.
Farley, Edward P., Co.,
1501 Railway Exchange Bldg., Chicago
Richardson, W. C., & Co., Cleveland, O.
VESSEL FITTINGS
Marine Equipment Co., Dept. of Kerr Machinery & Supply Co., Kerr Bldg., Detroit, Mich.
VISES
Williams, J. H., & Co., Brooklyn, N. Y.
WALKAWAY GRATINGS. See GRATINGS (for Floors, Walkaways, etc.)
WASHERS (Iron and Steel)
Milton Mfg. Co., Milton, Pa.
WATER COLUMNS (Safety Alarm)
Wright-Austin Co., Detroit, Mich.
WATER COOLING TOWERS
Wheeler, C. H., Mfg. Co., Philadelphia, Pa.
WATER CYLINDERS
Camden Forge Co.,
8th and Bulson Ave., Camden, N. J.
WATER GAGES
Jerguson Gage & Valve Co.,
Winter Hill, Somerville, Mass.
WATER HOSE
Voorhees Rubber Co., 20-56 Bostwick Ave.,
Jersey City, N. J.
WATER JET EDUCTORS
Schutte & Koerting Co., Philadelphia, Pa.
WATER LIGHTS (Self Igniting)
Galbraith, C. C., & Son, 47-49 West St., N. Y. C.
WATERPROOFING (Canvas)
Robeson Preservo Co.,
401 White Block, Port Huron, Mich.
WATER PURIFICATION SYSTEMS
Griscom-Russell Co., 2121 West St. Bldg., N. Y. C.
Schutte & Koerting Co.,
12th and Thompson St., Philadelphia
WATER TUBE BOILERS
Heine Safety Boiler Co.,
5325 Marcus Ave., St. Louis, Mo.
WELDERS
Wilson Welder & Metals Co.,
2 Rector St., New York City.

WELDERS (Electric Arc)
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wilson Welder & Metals Co.,
2 Rector St., New York City.
WELDING (Custom)
Linde Air Products Co., 42nd Street Bldg. N. Y. C.
Oxweld Acetylene Co., Newark, N. J.
WELDING (Electric)
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Vulcan Iron Works, Inc., Jersey City, N. J.
WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)
Air Reduction Sales Co., 120 Broadway, New York
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Oxweld Acetylene Co., Newark, N. J.
Prest-O-Lite Co., Inc., 30 E. 42nd St., N. Y. C.
Vulcan Iron Works, Inc., Jersey City, N. J.
WELDING AND CUTTING (Thermit)
Metals & Thermit Corp., 120 Broadway, N. Y. C.
WELDING METALS
Cramp, Wm., & Sons Ship & Eng. Bldg. Co.,
Philadelphia, Pa.
WELDING GLASSES
Oxweld Acetylene Co., Newark, N. J.
WELDING METALS (Special)
Wilson Welder & Metals Co.,
2 Rector St., New York City.
WELDING REPAIRS
Wilson Welder & Metals Co.,
2 Rector St., New York City.
WELDING RODS
Cramp, Wm., & Sons Ship & Engine Bldg. Co.,
Philadelphia, Pa.
Linde Air Products Co., 30 E. 42nd St., N.Y.C.
Oxweld Acetylene Co., Newark, N. J.
Prest-O-Lite Co., Inc., 30 E. 42nd St., N. Y. C.
WELDLESS STEEL RINGS
Camden Forge Co., 8th and Bulson, Camden, N. J.
WHISTLES
Crane Company, The, 836 S. Michigan Ave., Chicago
Lunkenheimer Co., The, Cincinnati, O.
WHISTLES (Electric Control)
Benson Electric Co., Superior, Wis.
WHISTLES (Steam)
American Steam Gauge & Valve Mfg. Co.,
Camden St., Boston, Mass.
WHISTLE CONTROL
McNab Co., The, Bridgeport, Conn.
WINCHES
American Clay Machinery Co., Bucyrus, O.
American Engineering Co., Philadelphia, Pa.
American Hoist & Derrick Co., St. Paul, Minn.
Chase Machine Co., 2313 Elm St. N. W., Cleveland
Chisholm-Moore Mfg. Co., The, Cleveland, Ohio.
Hyde Windlass Co., Water Street, Bath, Maine.
Marine Equipment Co., Dept. of Kerr Machinery & Supply Co., Kerr Bldg., Detroit, Mich.
Morse Dry Dock & Repair Co.,
Foot of 56th St., Brooklyn, N. Y.
Parish Supply & Mfg. Co.,
2848 Quinn St., Chicago, Ill.
Superior Iron Works, Superior, Wis.
WINDLASSES
American Clay Machinery Co., Bucyrus, O.
American Engrg. Co., Philadelphia, Pa.
American Ship Building Co., Cleveland, O.
Carpenter, Geo. B., & Co., 436 N. Wells, Chicago.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Water Street, Bath, Maine.
Lidgerwood Mfg. Co., New York City.
Superior Iron Works Co., Superior, Wis.
WIRE AND WIRING DEVICES
General Electric Co., Schenectady, N. Y.
Western Electric Co., 195 Broadway, N. Y. C.
WIRE ROPE
Lesbens, A., & Sons Rope Co., St. Louis, Mo.
WIRING DEVICES
Benjamin Electric Mfg. Co., Chicago, Ill.
Bryant Electric Co., Bridgeport, Conn.
WIRELESS SETS AND APPARATUS
Cutting & Washington Radio Corp.,
6 West 48th St., New York.
Kilbourne & Clarke Mfg. Co.,
Columbia St., Seattle, Wash.
Livingston, J., & Co., Inc.,
Grand Central Terminal, New York City
Marconi Wireless Co., New York City
WOOD BORING MACHINES. See MACHINERY (Wood Boring Pneumatic)
WOODEN SHIP REPAIRS
Tietjen and Lang Dry Dock Co., Hoboken, N. J.
WOODWORKING MACHINERY (Shipbuilders') See MACHINERY. (Shipbuilders' Woodworking)
WRENCHES
Coes Wrench Co., Worcester, Mass.
Parish Sup. & Mfg. Co., 2848 Quinn St., Chicago
Williams, J. H., & Co., Brooklyn, N. Y.
WRENCHES (Pipe)
Williams, J. H., & Co., Brooklyn, N. Y.
YACHT BUILDERS
Lake Erie Dry Dock & Mill Co., Sandusky, O.
YACHT ROPE
Whitlock Cordage Co., 46 Church St., N. Y. C.
YARN (Lath, Fodder)
Waterbury Co., 63 Park Row, New York City

Digitized by Google

KERR ECONOMY
MARINE EQUIPMENT



S. S. WESTWARD HO, 8800 Tons d. w. Cargo Ship equipped with 2500 S. H. P.
Kerr "Economy" Geared Marine Turbine.

The Use of Kerr 'Economy' Marine Equipment Means

"Economy" in Purchase Price
Installation and
Performance

Manufacturers of

Single or Cross Compound Multistage Turbines

Single or Double Reduction Gears
Capacities up to 6,000 S. H. P.

Also Manufacturers of Turbine Driven Auxiliaries, Turbo Generators, Pumps, Blowers, Etc.

KERR TURBINE COMPANY
WELLSVILLE, NEW YORK, U. S. A.

Digitized by Google

Classified Advertisements

Help and Positions Wanted—For Sale and Miscellaneous

"Help Wanted" Advertisements
4c per word—minimum advertisement—$2.00
All capitals—6c a word—minimum $3.00

"Position Wanted" Advertisements
4c per word—minimum advertisement—$1.00
All capitals—6c a word—minimum $1.50

"For Sale and Miscellaneous" Advertisements
8c per word—minimum advertisement—$2.00
All capitals—12c a word—minimum $3.00

Eight (8) words must be added for box address.

To insure insertion, advertisements must reach us by the 9th of the month.

Please have remittance accompany order.

Help Wanted

HANDYMAN WANTED FOR 55 FOOT, TWIN screw cruiser. Home port Milwaukee. Must be mechanic and pilot. License unnecessary. Address Box 277, THE MARINE REVIEW, Cleveland, O.

WANTED:—A MARINE AUXILIARY DRAFTSMAN, capable of designing steering engines. Permanent position. Give age, experience, education and salary expected. The Maine Electric Company, 35 Commercial Street, Portland, Maine.

Positions Wanted

POSITION WANTED BY THOROUGHLY EXPERI-enced ship joiner and carpenter. Desire position as foreman in either department or both on passenger or freight vessels. No objection to travel. Correspondence invited. References if necessary. Address Box 278, THE MARINE REVIEW, Cleveland, O.

MARINE SALESMAN
desires representation in Cleveland territory; experienced in reciprocating and turbine drives, holds unlimited ocean-going vessels engineer's license; thoroughly conversant with Marine Engineer's requisites. An opportunity to convince you will be appreciated. Address Box 270, THE MARINE REVIEW, Cleveland, O.

PARTY DESIRES TO CONNECT WITH SHIPPING CONCERN. CAN INVEST $50,000. ADDRESS BOX 276, THE MARINE REVIEW, NEW YORK CITY, N. Y.

HIGH CLASS MARINE ENGINEER AND DE-signer on marine engine. Boiler and machinery. 22 years of practical engineering and designing experience. Address Box 268, THE MARINE REVIEW, Cleveland, O.

Wanted

WANTED:—STEEL BOTTOM DUMP SCOW FOR carrying ashes. Must be of large capacity, in good condition and not too old. Address Box 264, THE MARINE REVIEW, Cleveland, O.

WANTED:—STEEL SAND SUCKER IN GOOD condition. State price, capacity and other particulars. Address Box 272, THE MARINE REVIEW, Cleveland, O.

WANTED:—STEEL SCOW 600 TO 1000 TONS capacity. Answer giving full particulars. Address Box 280, THE MARINE REVIEW, Cleveland, O.

For Sale

FOR SALE
New
Triple Expansion Engine and Thrust Bearing
Size 12¾, 21½, 35 x 24
With Condenser, Air, Bilge and Feed Pumps attached.
All new. Quick delivery.
Address Box 275, THE MARINE REVIEW, Cleveland, O.

TWO STEEL FREIGHT STEAMERS ABOUT 1,000 tons each. Also several covered Lighters capacity Lumber Three Hundred Fifty Thousand. Address: Thomas Joyce, Foot of Front Street, Long Island City, N. Y.

For Sale

NEW EQUIPMENT FOR SALE
7 x 10 Spur Geared Anchor Windlass.....$2000.00
8 x 10 Spur Geared Anchor Windlass..... 2300.00
U. S. IRON WORKS, SEATTLE, WASH.

SALE BY THE U. S. NAVY

MOTORBOATS, BARGES, TUGS,
TRAWLERS, YACHTS,
SUB-CHASERS, TORPEDO BOAT DESTROYERS,
GUNBOATS, ETC.

Sales are being made constantly of vessels belonging to the NAVY taken over for war purposes. A very large number of vessels still remain to be sold. Vessels are sold by sealed bids receivable at the advertised time in the Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

From time to time schedules of sale are issued giving full description of the vessels, location, appraised value and stating the time when bids will be opened. These schedules are mailed to all known to be interested.

Write the Bureau of Supplies and Accounts requesting the schedules of sale of vessels be mailed to you—

JOSEPHUS DANIELS,
Secretary of the Navy.
10-29-19.

For 60 pages of excellent values in
MARINE ENGINES
Hoists, Pumps, Boilers, Wire Rope,
Piling, Rails, Cars, Locomotives, etc.
Get Our New Bulletin No. 270
ZELNICKER in ST. LOUIS

FOR SALE:—12" x 14" x 12" DUPLEX LAID-law-Dunn-Gordon Compressor built in Cincinnati, Ohio. Just recently thoroughly overhauled our shops. Seaboard Transportation & Shipping Co., Galveston, Texas.

FOR SALE:—WOODEN STEAMER (CANADIAN register) 127' long 27' beam 9' 7" depth of hold F & A Comp engine 18 x 32 Scotch Boiler. Also tow barge (Canadian) 152' long 28' 7" bean 11' 3" depth of hold. Address Box 279, THE MARINE REVIEW, Cleveland, O.

For Sale

BARGAINS! STOCK SHIPMENT
DIRECT CURRENT MOTORS
230 V.—250 V.—All Rebuilt

No.	Hp.	RPM.	Wdg.	Type—Make	Price ea.
1	¼	975	Sh.	Westinghouse	$ 33.00
1	1	750	Series	D—Mech. App.	65.00
5	5	400/1600	Sh.	SK—Westinghouse	195.00
		With controllers;		used 3 months.	
1	5	1000	Cp.	MP—West'n Elec.	150.00
1	5	1870	Sh.	CVC—Gen. Elec.	145.00
20	7½	500/1500	Sh.	SK—Westinghouse	260.00
		With controllers;		used 3 months	
5	8½	900/1800	Sh.	SK—Westinghouse	220.00
		With controllers;		used 3 months	
7	11½	500/1500	Sh.	SK—Westinghouse	325.00
		With controllers;		used 3 months	
1	15	650	Sh.	MP—Triumph	300.00
1	15	750	Sh.	MP—Milwaukee	375.00
1	15	725	Cp.	MP—Northern	385.00
1	17½	585	Sh.	A-14—Gibbs	325.00
1	20	900	Sh.	MP—Hobart	390.00
1	20	650	Sh.	MP—Milwaukee	400.00
1	20	975	Sh.	S—Westinghouse	395.00
1	20	600	Sh.	MP—West'n Elec.	425.00
1	20	750	Sh.	MP—Northern	400.00
2	25	800	Cp.	MP—Northern	450.00
1	25	650	Sh.	MP—Nat'l Brake	425.00
1	30	525	Sh.	MP—Northern	560.00
1	40	675	Sh.	MP—Northwest'n	650.00
1	50	525	Sh.	MP—Northern	710.00
1	50	625	Sh.	A-40—Milwaukee	770.00
1	50	950	Cp.	CCD—Cr. Wh.	850.00
1	80	630	Cp.	CQ—Gen. Elec.	950.00
1	165	650	Cp.	M—Westingh'se	1600.00

Write, wire or 'phone our nearest office:
DUQUESNE ELECTRIC & MFG. CO.
New and Used Electrical Equipment
PITTSBURGH, PA., or 230 So. La Salle St.,
CHICAGO, ILL.
Refer Inquiries to Marine Dept.

FOR SALE:—10 DOUBLE CYLINDER 8¼" x 10" double drum, Hyde Deck Hoists. 4-6 x 8 Steam Driven Capstans. G. J. Adams, 39 South St., New York City, N. Y.

BRASS RODS
All sizes, at a bargain, for quick buyer. Write for further information.
NORTHERN METAL CO.,
2314 N. Second Street, Philadelphia, Pa.

TWO LIFE RAFTS IN A1 CONDITION WITH complete equipment. One 15 persons and the other 20 persons. The Mackinac Transportation Co., St. Ignace, Mich.

DECK CAPSTAN
FOR SALE
1—8 x 8 Twin Engine Steam Deck Capstan
in A 1 condition. A real bargain.
American District Steam Co.,
North Tonawanda, N. Y.

FOR SALE:—1 FORE AND AFT MARINE ENGINE
8" x 16" x 10½" Keel Condenser (Brass) with pumps complete, fine condition. Made by W. J. Sanderson, Syracuse, N. Y.; 1 Roberts Boiler, Water tube, shop No. 550, 7' x 5' pressure allowed, 250 pounds with feed water pump complete. THE CARROLL FOUNDRY CO., HOUGHTON, MICH.

Digitized by Google

For Sale

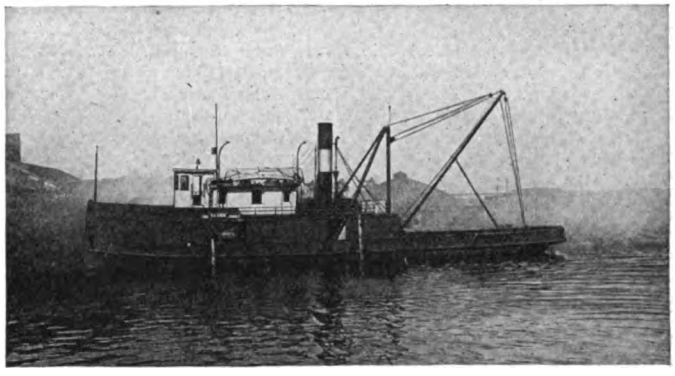
Plant and equipment of The Rocky River Dry Dock Co. at Rocky River, Ohio

This yard has handled a large amount of repair work on Commercial boats, and has turned out a number of high class pleasure boats. During the war eight submarine chasers and five mine layers were built for the U. S. Government. Anything in wood construction up to 200 feet can be handled.

Equipment includes a good marine railway, together with complete inventory to carry on the business. Rocky River is seven miles west of the business center of Cleveland, and a good labor district. A competent yard force can be gotten together on short notice.

If interested, communicate with

E. T. Shannon and T. B. Van Dorn, Receivers, Rocky River Dry Dock Co.
Rocky River, Ohio



FOR SALE

Repair Steamship "GLOBE"

92' long, 17' Beam, in first class condition, new boiler, fore and aft Compound Engine, speed 12 miles per hour, equipped with Air Compressor, Electric Welder and 2½ ton Derrick Crane and all necessary tools for making speedy repairs to vessels, Hulls, Engines and Boilers while loading or discharging cargoes. Can be bought at a bargain.

GLOBE SHIPBUILDING COMPANY
Superior, Wisconsin

Here's the Natural Market for "Outgrown" Marine Equipment

Millions of dollars are annually invested in used equipment by Operators of the American Marine Industry and the major part of this business is placed with advertisers. There's a reason.

The very fact that most equipment, which is offered for sale, is outgrown—not worn out—guarantees full service to the purchaser and at a great saving in cost. Such bargains, however, can only be "discovered" by constantly watching the "classified" section of THE MARINE REVIEW.

The advertising buyer and seller are at all times served to their mutual advantage and in a manner made possible only by the means employed.

If you have a boat, engine, boiler, or any other equipment, of which you wish to dispose, don't hang on to it—advertise it in THE MARINE REVIEW and a buyer will be quickly found.

For producing service, address

THE MARINE REVIEW Cleveland, O.

Digitized by Google

Index to Advertisements

A

Air Reduction Co., Inc..... 17
Alabama Dry Dock & Shipbuilding Co. 78
Almy Water Tube Boiler Co..... 140
American Balsa Co., Inc..... 38
American Bitumastic Enamels Co.. 150
American Blower Co..... 25
American Bureau of Shipping..... 69
American Chain Co., Inc..... 150
American Clay Machinery Co..... 171
American Engineering Co..... 18
American Flexible Bolt Co..... 70
American Hoist and Derrick Co.... 41
American Injector Co..... 144
American Line 155
American Manufacturing Co..... 24
American Pipe Bending Machine Co. 169
American Shipbuilding Co.....88, 89
American Steam Gauge & Valve Mfg. Co. 142
American Steel Foundries..... 26
Anderson, V. D., Co., The..... 144
Ashton Valve Company..... 142
Associated Business Papers, Inc.... 36
Atlas Steel Casting Co..... 148

B

Babcock & Wilcox Co., The..... 138
Ballin Water Tube Boiler Co..... 139
Baldt Anchor Co..... 165
Baltimore Dry Dock & Shipbuilding Co. 73
Barker, Donahue, Anderson & Wylie 156
Bay State Iron Works..... 145
Benjamin Electric Mfg. Co..... 21
Benson Electric Co..... 151
Bernstein Mfg. Co..... 157
Bethlehem Shipbuilding Corp., Ltd. 146
Blodgett, O. W..... 154
Boland & Cornelius..... 154
Borne, Scrymser Co..... 76
Boston & Lockport Block Co..... 169
Braga, J. R..... 169
Bramhall, Deane Co..... 153
Brauer, Justus & Son..... 171
Bridgeport Boiler Works Co..... 140
Browning Co., The..... 45
Brunswick Refrigerating Co..... 60
Bryant Electric Co..... 151
Buffalo Dry Dock Company.....88, 89
Burger Boat Co..... 82

C

Camden Forge Co..... 67
Carlin Co., Anthony, The..... 165
Carpenter, Geo. B., & Co..... 40
Central Foundry Co..... 152
Champion Engineering Co..... 47
Champion Rivet Co..... 178
Chase Machine Co..... 169
Chesapeake Iron Works..... 146
Chicago Pneumatic Tool Co..... 14
Chicago Ship Bldg. Co.....88, 89
Cleveland Pneumatic Tool Co..... 70
Coes Wrench Co..... 72
Collingwood Shipbuilding Co..... 80
Commercial Boiler Works..... 140
Congressional Information Bureau... 151
Continental Iron Works, The..... 48
Cook, C. Lee, Mfg. Co., Inc..... 143
Cory, Chas., & Son, Inc..... 44
Cox & Stevens..... 158
Cramp, William, & Sons Ship & Engine Building Co..... 57
Crandall Engineering Co..... 76
Crane Co. 32
Crescent Machine Co..... 169
Cutting & Washington Radio Corp. 155

D

Dake Engine Co..... 62
Davidson & Hudson..... 156
Davis, M. M., & Son, Inc..... 146
DeLaval Steam Turbine Co..... 33
Detroit Seamless Steel Tubes Co... 27
Detroit Shipbuilding Co.....88, 89
De Vilbiss Mfg. Co..... 68
Dew Valve Co., Inc..... 46
Donnelly, William T..... 158
Dravo-Doyle Co. 159
Drein, Thos., & Son Co..... 155

E

Electric Hose & Rubber Co..... 153
Electrose Mfg. Co.....Inside Front Cover
Engberg's Electric & Mechanical Works 44

F

Fairbanks, Morse & Co..... 56
Falk Co. 30
Farley, Edward P., Co..... 154
Fire Detecting Wire Co., Inc..... 150
Fletcher, W. & A., Co..... 145
Foundation Co.-Port Huron Ship Yard, Inc. 77
France Packing Co..... 144
Fraser Brace Shipyards, Ltd..... 80

G

Galbraith, C. C., & Son, Inc..... 148
Gas Products Association..... 68
General Electric Co..... 22
Geyser Boiler Appliance Co..Front Cover
Gielow & Orr..... 158
Globe Shipbuilding Co..... 175
Goodrich, B. F., Rubber Co..... 12
Goodrich, William F..... 158
Goulder, White & Garry..... 156
Gracey, R., & Sons Co..... 149
Great Lakes Engineering Works.... 90
Griscom-Russell Co., The..... 42

H

Hanna, M. A., & Co..... 178
Hardie-Tynes Mfg. Co..... 52
Heine Safety Boiler Co..... 50
Heppenstall Forge Co..... 65
Heppenstall Forge & Knife Co.... 65
Hobbs, Clinton E., Co..... 157
Holding, Masten, Duncan & Leckie 156
Holmes Metallic Packing Co..... 139
Hooven, Owens, Rentschler Co..... 53
Hughes-Limbach Co. 144
Hutchinson & Co..... 154
Hyde Windlass Co..... 28

I

Independent Pneumatic Tool Co... .....Inside Front Cover
Ingersoll-Rand Co. 15
International Mercantile Marine Co. 155
Irving Iron Works Co..... 72
Isherwood, J. W..... 71

J

Jerguson Gage & Valve Co..... 153

K

Keller Pneumatic Tool Co..... 157
Kelley & Cottrell..... 156
Kelvin & Wilfrid O. White Co.... 64
Kerr Machinery Corp..... 147
Kerr Turbine Co..... 173
Kingsford Fdy. & Mach. Works.. 139
Kingsbury Albert, Engineer..... 153
Kremer, C. E..... 156
Kroeschell Bros. Ice Mach. Co.... 159
Kuhls, H. B. Fred..... 150

L

Lake Erie Boiler Works..... 51
Lane, C. M., Life Boat Co..... 155
Leavitt Deep Sea Salvage Co., Inc. 169
Leschen, A., & Sons, Rope Co.... 149
Leslie-Stevens Co., Inc..... 158
Lidgerwood Mfg. Co..... 43
Linde Air Products Co..... 137
Livingston, J., & Co., Inc..... 151
Locomotive Superheater Co..... 138
Lorain Coal & Dry Dock Co..... 143
Lukens Steel Co..... 56
Lunkenheimer Co. 62

M

McDougall-Duluth Co. 87
McLouth, Sydney C..... 165
McMillan's, W. H., Sons..... 169
McNab Copmany, The..... 159
Malleable Iron Fittings Co..... 165
Manitowoc Shipbuilding Co..... 84
Marconi Wireless Telegraph Co. of America 163
Marine Decking & Supply Co..... 141
Marine Equipment Co..... 165
Marine Hardware-Equipment Co.... 66
Marine Iron & Ship Building Co.. 86
Mark Mfg. Co..... 54
Martell Packings Co..... 145
Mason Regulator Co..... 142
Mechanical Rubber Div..... 34
Merchant Shipbuilding Corp..... 82
Mesta Machine Co..... 63
Metal & Thermit Corp..... 165
Milton Mfg. Co., The..... 66
Milwaukee Dry Dock Co.....88, 89
Milwaukee Elec. Crane & Mfg. Co. 146
Montreal Transportation Co..... 155
Morris Machine Works..... 39
Morse, Andrew J., & Son, Inc.... 171
Morse Dry Dock & Repair Co..... 75
Mulholland Hatch-Fastener Co..... 171
Mutual Truck Co..... 23

N

National Foundry Co..... 58
National Roofing Co..... 171
National Transit Pump & Mch. Co. 85
Natroco Paint & Varnish Works.. 171
New London Ship & Eng. Co..... 52
New York Blue Print Paper Co.... 157
New York Engineering Co..... 50
Northwest Engineering Works..... 78
Norwalk Iron Works Co..... 152

O

Ohio Blower Co..... 152
Ohio Ship Building Co..... 85
Oldham, George, & Son Co..... 152
Oldman Boiler Works, The..... 138
Oliver Iron & Steel Co..... 148
Osborn & Co..... 154
Oxweld Acetylene Co..... 4

P

Penberthy Injector Co..... 142
Pickands, Mather & Co..... 143
Pioneer Boiler Works..... 165
Pneumercator Co., Inc..... 138
Power, L., & Co..... 169
Power Specialty Co..... 140
Prest-O-Lite Co. 177

Q

Quickwork Co. 149
Quertier, D. 157
Quigley Furnace Specialties Co., Inc. 171

R

Refrigeration Engineering Co..... 19
Reid, John, & Co.....48, 158
Richardson, W. C., & Co..... 154
Ritchie, E. S., & Sons..... 171
Rocky River Dry Dock Co..... 175

S

St. Lawrence Marine Railway Co.. 159
Saginew Shipbuilding Co..... 83
Sandusky Foundry & Machine Co.. 40
Schutte & Koerting Co..... 54
Seidler-Miner Co., Inc..... 20
Severance, S., Mfg. Co..... 148
Shepard Eletcric Crane & Hoist Co. .....Inside Back Cover
Sheriffs Manufacturing Co..... 171
Siggers & Siggers..... 158
Smith, Arthur F., Co., Inc..... 155
Spencer & Spencer..... 156
Sperry Gyroscope Co..... 3
Stover & Stover..... 156
Stratford, Geo., Oakum Co..... 147
Sullivan Lumber Co..... 147
Sun Company 161
Sun Shipbuilding Co..... 84
Superior Iron Works Co..... 13
Superior Ship Building Co.....88, 89

T

Taylor, S. K., Lumber Co..... 171
Texas Company, The..... 167
Thatcher Propeller & Foundry Corp. 74
Thomas Grate Bar Co..... 49
Thomas Spacing Machine Co..Back Cover
Todd Shipyards Corp..... 86
Toledo Shipbuilding Co., The..... 81
Traylor Engineering & Mfg. Co.... 55
Trout, H. G., Co..... 74
Turner, Halsey Co..... 150
Tyler Tube & Pipe Co..... 140

U

Union Steam Pump Co..... 143
United Engineering & Foundry Co. 61
U. S. Chain & Forging Co..... 31
U. S. Crane Co..... 171
U. S. Metallic Packing Co..... 144
United States Rubber Co..... 34

V

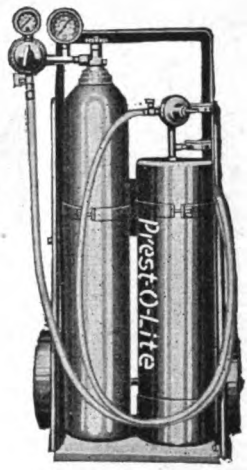
Van Krieken, H., & Co..... 154
Vance & Joys Co..... 154
Van Dorn Electric Tool Co..... 58
Voorhees Rubber Mfg. Co..... 142
Vulcan Iron Works, Inc..... 145

W

Wager Furnace Bridge Wall Co.... 145
Walker, Thomas, & Son, Ltd..... 159
Ward, Charles, Engineering Works.. 139
Warren, Cady, Ladd & Hill..... 156
Waterbury Company 29
Watson Engineering Co..... 158
Wellman-Seaver-Morgan Co. 6, 7
Western Electric Co..... 38
Western Spar Co..... 147
Westinghouse Electric & Mfg. Co. 8, 9
Wheeler, C. H., Mfg. Co..... 37
Wheeler Condenser & Engrg. Co... 149
Wheeling Mold & Foundry Co..... 59
Whitney Bros. Co..... 79
Whiting Foundry Equipment Co... 46
Whitlock Cordage Co..... 60
Wickes Boiler Co..... 138
Williams, J. H., & Co..... 64
Worthington Pump & Machinery Corp. 10, 11
Wright-Austin Co. .....Back Cover

Digitized by Google

Prest-O-Lite



The Universal Gas with the Universal Service

Every concern having a production problem involving the joining or sundering of metals, or the maintenance of machinery, will naturally be led to oxy-acetylene because of its greater range of serviceability, its economy and flexibility.

"PREST-O-LITE",—as the convenient portable cylinder with its contents of purest (ready-made) acetylene is called—is the gas without limitations, dissolved chemically so that a large quantity is available in small bulk.

Once your initial supply of cylinders is at hand, you are ready for any kind of flame heating operation—from the lightest soldering or brazing to the heaviest welding and cutting jobs—for the least time and money cost. It is then the business of PREST-O-LITE service to insure your prompt replacements.

Prest-O-Lite

DISSOLVED ACETYLENE

The Gas of a Thousand Uses

Whether the job be on the superstructure of a steel bridge or in a mine or the hold of a vessel, PREST-O-LITE is always ready to be carried to the spot and to deliver its contents efficiently and conveniently.

Thanks to PREST-O-LITE'S part in the war, there are today more plants and more cylinders than ever before—a great asset to every user, present or prospective. We'd like to tell you more about PREST-O-LITE Service and the plan under which our users enjoy it.

THE PREST-O-LITE CO., Inc., General Offices, 42nd St. Building, New York City
Kohl Building, San Francisco

128

Digitized by Google

Coal

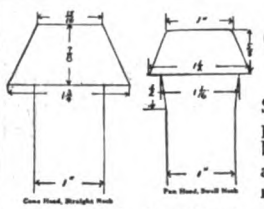
For shipment via Great Lakes in CARGO LOTS or for Fueling Vessels. Write or 'phone us for prices on best grades of Domestic, Coking, Gas and Steam coals for prompt delivery.

M.A. HANNA & Co.

Sales Agents, Cleveland

HANNA

UNBROKEN AFTER 25 YEARS TEST



Cone Head Straight Neck

Pan Head Swell Neck

Champion Says:

The great advantage of using Swell Neck Rivets for Marine purposes is freely acknowledged by all the leading Ship Builders, and endorsed by them in their regular practice.

These rivets are made to fill holes in *punched plates.* The diameter of the punched hole on the *die side* is always slightly larger than the hole on the *punched side.* In other words, the *punched hole* is of *conical shape.*

In assembling, the plates are *reversed,* and by the use of Swell Neck Rivets the holes are completely filled, and the production is increased to a maximum, while the loss occasioned by loose rivets is reduced to a minimum.

The strength of the joint is further increased by the use of steel made according to U. S. Navy, American Bureau of Shipping, or Lloyd's Specifications, which add at least 5,000 pounds to the shearing strength, and 10,000 pounds to the tensile strength.

Our rivets conform strictly to specifications. We carry the largest stock of rivet bars and made up rivets in the world.

ALL SIZES ALL LENGTHS

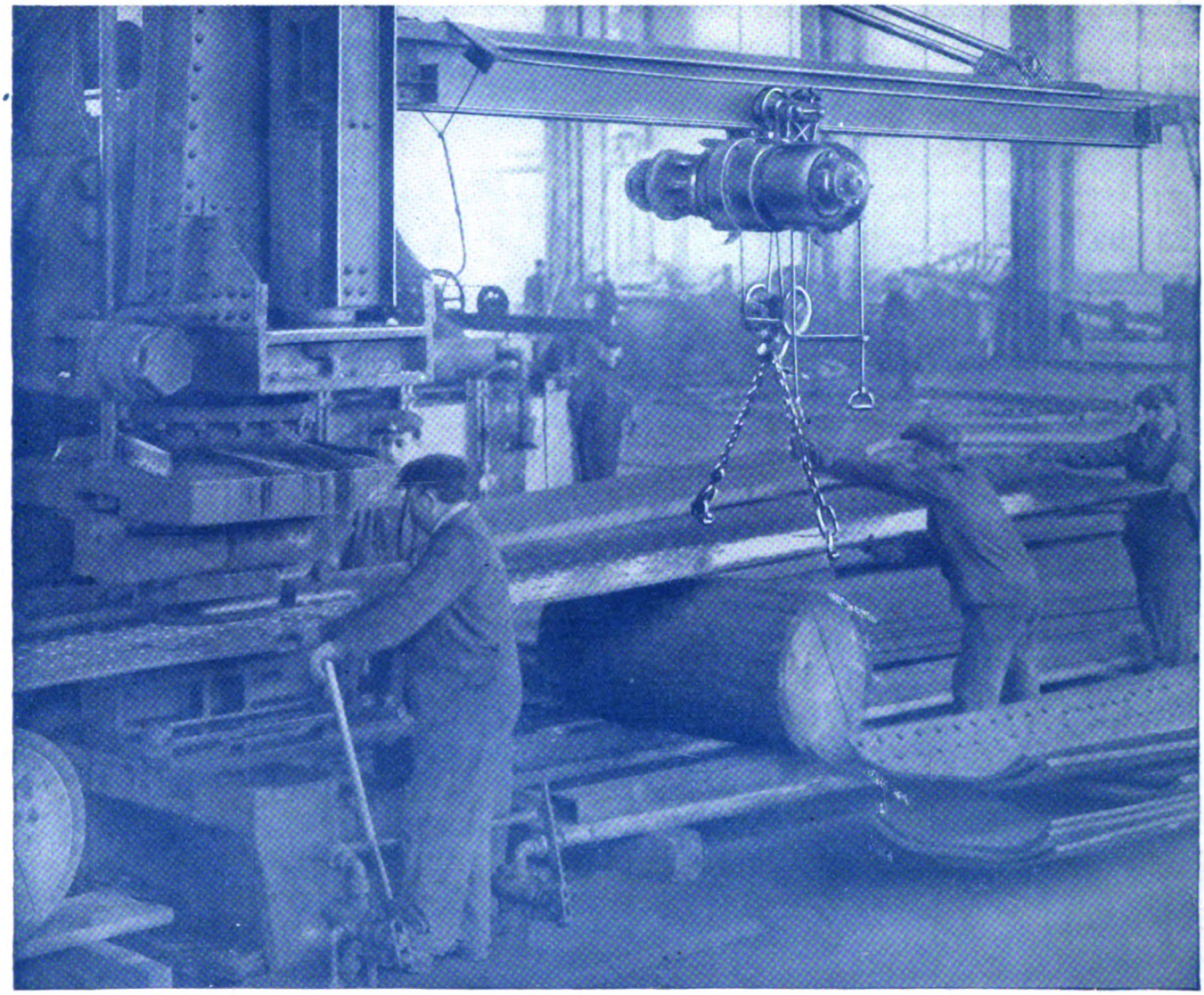
Driven Rivet

ON EVERY HEAD

THE CHAMPION RIVET COMPANY

CLEVELAND, O. AND EAST CHICAGO, IND.

Digitized by Google



Difficult jobs simplified—

A Shepard Electric Hoist expedites punching, cutting, drilling, sawing, bending and similar operations.

It facilitates raising heavy stock into position for feeding into the machine. The hoist trolley, equipped with roller bearings, carries the piece along the I-beam runway and simplifies the job of sending it through the machine.

No hand hoisting nor hauling. This easily controlled electric hoist does all the heavy work.

Avail yourself of the services of our engineers who can intelligently assist in the selection of suitable hoisting equipment.

SHEPARD ELECTRIC CRANE & HOIST CO.

360 Schuyler Ave., Montour Falls, N. Y.

New York Philadelphia Chicago Pittsburgh Boston Baltimore
Cleveland San Francisco Montreal Melbourne London

Member of Electric Hoist Manufacturers' Association

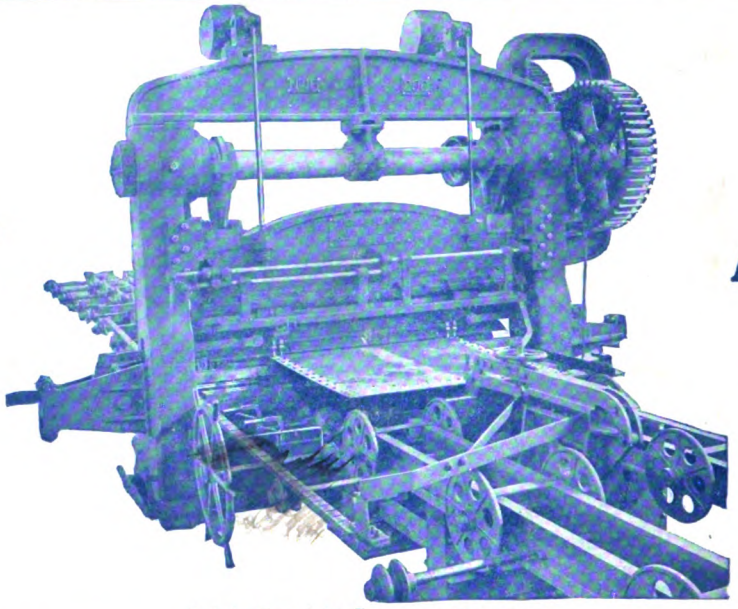
2178-S

REG. U.S. PAT. OFF.

SHEPARD
ELECTRIC CRANES & HOISTS

Digitized by Google

"Thomas" Tools



Are Time Savers

Built for Great Lakes Engineering Works, Detroit

"Universal" Type Multiple Punch and Hand-Operated Spacing Table

(*Send for Bulletin 109 MB*)

Thomas Spacing Machine Co.

Fulton Building — Cable Address: "Thomaspace," Pittsburgh — Pittsburgh, Pa., U. S. A.

Builders of Thomas Spacing Tables and Multiple Punches, One-Man Roll Tables, Pantograph Punching Tables, Angle Planers, Angle Bevelers, and Standard Line of Punching and Shearing Machinery.

This Steam Trap Operates When Ship Rolls to 70 Degree Angles

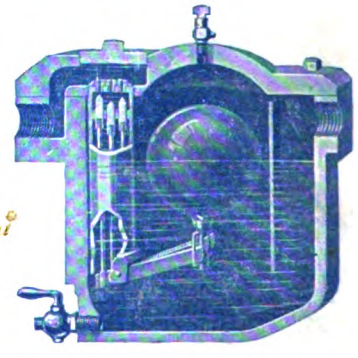
Rough, high seas causing ships to roll to angles as great as 70 degrees does not effect the Wright "Emergency" Steam Trap. Its deep water seal enables it to work efficiently and dependably under the most extreme rolling.

Laboring under the most unusual tests of storms and accidents, the Wright "Emergency" Steam Trap has proved unfailingly reliable for steamship use.

Being compact in size, the "Emergency" Trap is adaptable to wide ranges of pressure without changing parts. It has a straight connection to the body of the trap, which permits removing the cover and taking all inside parts to the work bench or to the light for inspection without disturbing any pipe connections.

Standard with STEAM USERS SINCE '94

Write your name and address on the margin of this page — forward to the Wright-Austin Company—and our new catalog will be sent you by return mail.



Wright-Austin Company

Detroit, Michigan

Branches: New York, Boston, Atlanta, Chicago. Representatives and Dealers Everywhere

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

UNIVERSITY OF ILLINOIS-URBANA
3 0112 043868501

Digitized by Google